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in Cider®

Green's Apple* Magazine

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Developed by Don't Ask Computer Software, Inc.

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inCider™

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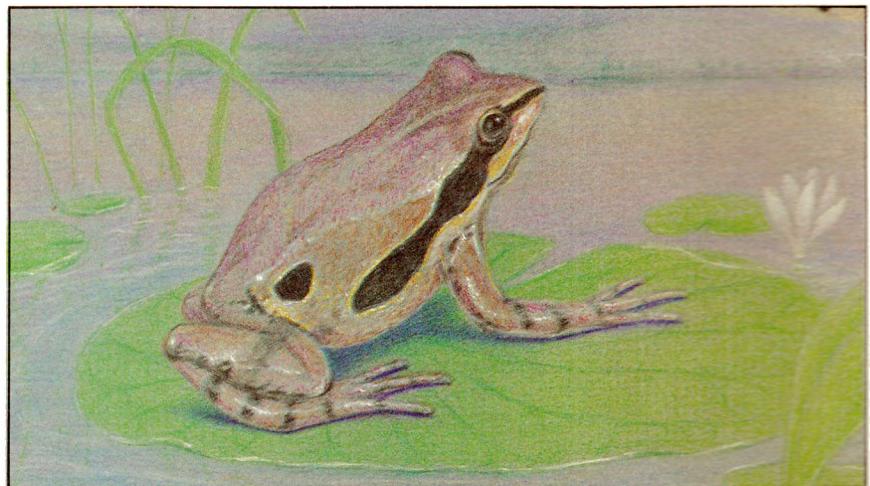
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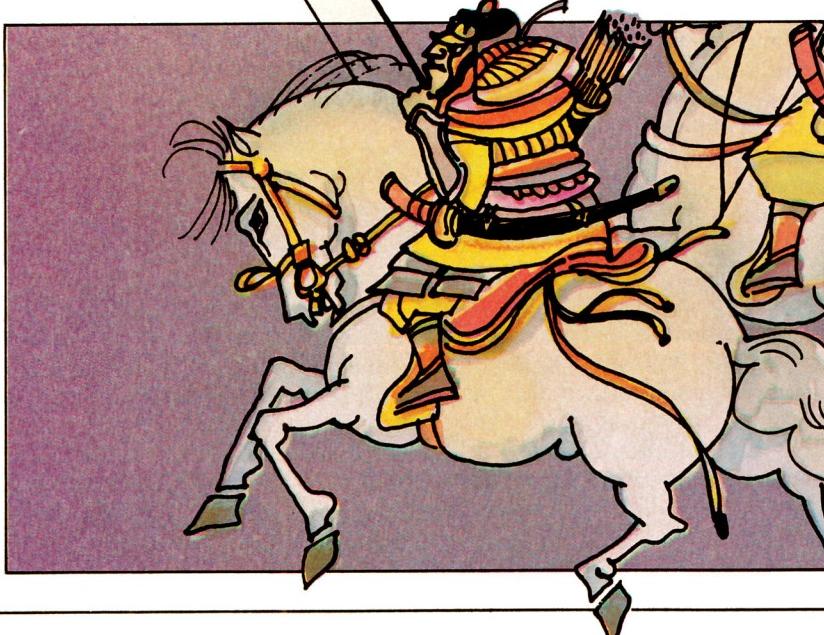
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The Lost White Smock

by Wayne Green



Was it just a couple of years ago that the data processing departments of larger firms (small firms couldn't afford them) were run by white-smocked professionals? Computer scientists, speaking in their own weird tongue, held the business world at bay, protecting their sanctums with mystery.

The minicomputer began to erode this system as it brought in lower-cost computers. But even the minis generally required a laboratory environment, both temperature and humidity controlled, plus a staff of in-house programmers and a DP manager.

The real cracks in the wall have been made by the creeping in of microcomputers. The DP and MIS (management information systems—another term for DP) staffs fought off the desktop computers as long as they could, but sneaky management people started bringing them in masquerading as personal gear.

The situation came to a head as more and more management people wanted to start getting data from the company computer to use with their desktop systems. The desktops came in as advanced calculators, word processors, spreadsheet devices and so on—but they did come in. And now the DP people are having to deal with them—or else.

One result of this change in management techniques which the desktop computer has made possible has been the reduction of layers of management. This means a substantial cut in costs for a firm, so once the old management systems started to crumble, we saw them toppling everywhere.

Remember that it takes about ten

dollars in sales to pay for a lost dollar of overhead if a firm is making a ten percent profit on sales. Thus the cutting of management quickly reflects the savings as profits with a lot of leverage. From this it is obvious, I hope, that the move toward integrated computer systems in both large and medium-sized firms has got to accelerate.

Larger firms will be mainframe-based, with desktop terminals proliferating. These integrated systems will handle accounting, inventory, sales, and so on. They will handle all kinds of customer and supplier information. Management will have access to the figures they need for reports so they can keep track of what is happening.

In smaller firms we'll see minicomputers or high-end micros serving as the host system, again working with a bunch of micros—feeding them data on demand—networking them for communications. Desktop computers will be used by clerks entering and checking data as well as by management at all levels.

I have spoken and that is how it shall be.

One thing that is getting lost in the whole process is the smug smocked DP professional. In general these people have been knocked into speaking English now that they find they have no choice but to communicate with all levels of management. And they belatedly are having to come to grips with interfacing desktop computers to their germ-free mainframes. Some are adapting to the change; others are fighting the best rear guard battle they can. ■

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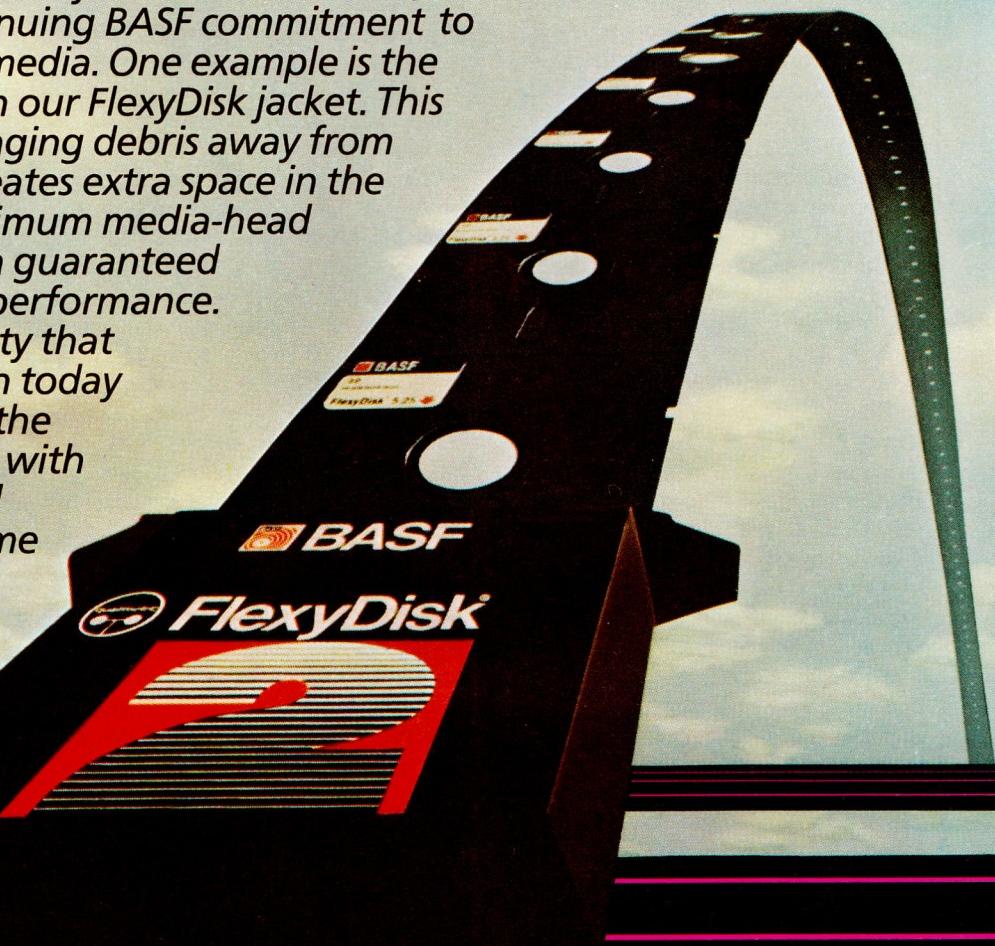
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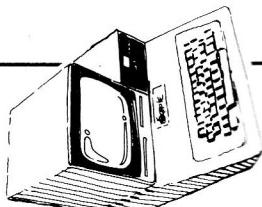
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Fermentations

by Sam Whitmore
inCider staff



Should Mac Snub MS-DOS?

Before you start reading, take another look at our front cover. Isn't she a beauty? The Macintosh has arrived, and as you will read later in this issue, this astonishing machine should turn the microcomputer industry on its collective ear.

But once again, Apple has released another product whose operating system is incompatible with current industry standards—Microsoft's MS-DOS and its cousin, IBM's PC-DOS. Apple DOS 3.2 and 3.3 lost out to CP/M for business software market supremacy. Apple's operating system for the III—SOS—is widely regarded as a failure. And as wonderful as it is, the Lisa still isn't MS-DOS compatible and thus cannot be easily integrated into the so-called Fortune 1000 business environment.

"You've got to understand Apple's strategy," explains Matt Meehan, microcomputer analyst for Salomon Brothers. "They're not out to become an IBM-compatible manufacturer. There's room for someone else to do something different. Remember, there are Ford people and there are Chevy people."

The Macintosh has an "invisible" operating system. Subroutines etched into the ROM chips construct what's called the "Mac Tool Box," wherein pull-down menus, icons and a mouse provide the machine's only user interface. Think of it: Typed-in commands and syntax errors are things of the past!

"The Macintosh is going to be a dynamite product," proclaims Meehan, "so much so that MS-DOS isn't going to be that much of an issue. Apple's biggest challenge is getting sufficient amounts of third-party software, because they just can't afford to repeat the mistakes they made with Lisa. If the Mac has enough proprietary software, it shouldn't have to rely on anyone else's."

The Macintosh reflects Apple Computer's belief that IBM is about to pull the plug on MS-DOS compatible machines. Says one source close to Macintosh midwife Steve Jobs: "Steve feels that IBM will soon develop its own operating system and won't share it with other people. And obviously, if IBM develops it, it will become a standard. So if we come out with an MS-DOS compatible machine today, we'd be crawling right into the grave.

"And besides," the source adds, "since we have a better technology than MS-DOS, what would be the point?"

The point would be that (1) with MS-DOS compatibility, the Mac could accommodate the world's fastest-growing software library, and (2) large businesses—with their vast investments in this software—would order Macs by the boxcar.

MS-DOS software won't matter if software writers flock to the Mac as Apple believes they will—and they have good reason. Thanks to the routines that make up the Mac Tool Box, developers no longer must devote large amounts of time creating the user interface for their programs. And because Mac's magic ROMs allow data in one program to be transferred to any other, the Mac environment will attract America's most ambitious, gifted programming talent.

Integrating Macs into the mainframe environment won't be possible until later this year, but that's not so awful. "The Macintosh is designed for people who perform one or two specific tasks," says Wall Street market analyst Don Sinsabaugh, "whether they be word processing, calculating or producing reports. It's a personal productivity tool, and that kind of market doesn't require MS-DOS compatibility."



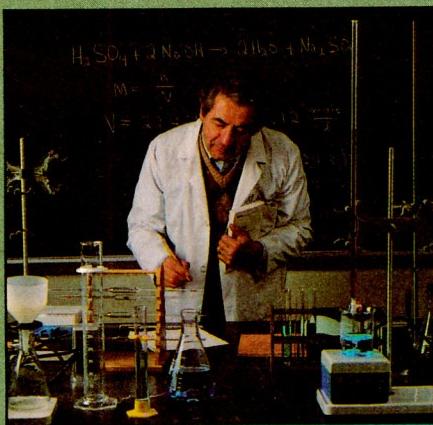
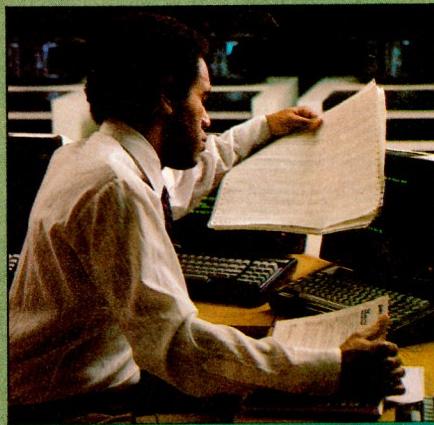
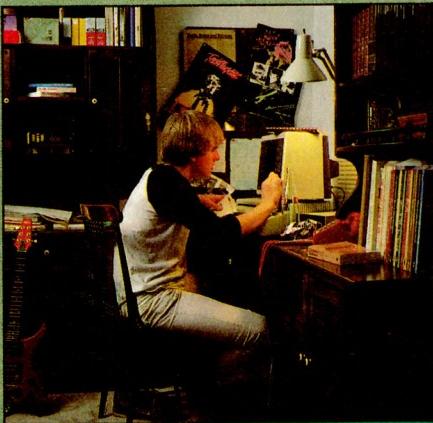
Apple expects small and medium-sized businesses, professionals and students to eat up the Mac. "We're shooting for people who do not already own computers and who do not need a giant networking system," says one Apple source who requested anonymity. "We realize we made a few mistakes marketing the Lisa, so believe me, the marketing for Macintosh has been very carefully thought out."

More important than marketing are margins; Apple must make money selling these machines, and analyst Matt Meehan wonders how it can. "In the long term, I don't see Apple turning a great profit—at least not nearly as much as in the past. Actually, they're a little late delivering a product like the Macintosh. Because Apple's competitors are stronger now, the amount of time Apple will enjoy a monopoly on these new standards will be less than, say, when they introduced the Apple II."

Perhaps MS-DOS will fade away as some suggest. But clearly, in bypassing MS-DOS compatibility for the Macintosh, Apple has taken a short-term calculated risk. Messrs. Jobs and Wozniak fervently hope the enhanced Lisa and the Mac together can erode IBM's malignant presence in the corporate marketplace—which universally demands MS-DOS. Failing that, the Macintosh must take by storm the less-structured small-business and student markets.

If it doesn't, Apple is in a peck of trouble. ■

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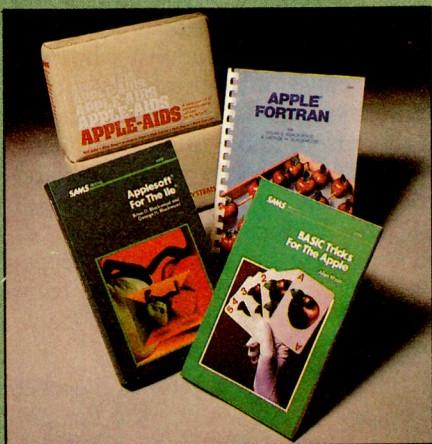
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APPLE FORTRAN gives you helpful programming tips for writing in Apple FORTRAN 77. Its many illustrations and sample programs quickly show you the source statements, loops, arrays and subroutines you need to write many smooth-running programs. It also includes an introduction to the Apple Pascal language card. No. 21911, \$14.95.

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Letters

Mystery Solved

Since I do a lot of graphics programming, I was very interested in "Move and Restore" (Hints 'n' Techniques, July 1983) by Dave Schroeder. I couldn't get it to work properly, however. The problem seemed to be in the zero-page memory location used to hold the vertical dimension of the picture segment being moved. No matter how large a value I put in this location (\$1F), it would only move a section about five lines high. Changing that location to a different zero-page location solved the problem (I used \$FF), but I wondered *why*.

The answer evidently lies in the fact that my Apple is a IIe. According to the old *Apple II Reference Manual* (pp. 74, 75), location \$1F is not used by the monitor, either of the Basics, or DOS. But in the *Apple IIe Reference Manual* (pp. 66, 67), \$1F is listed among locations used by the monitor.

I hope this information is of use to other IIe users. Thanks for a fine publication.

Doug Heacock
627 W. 25th, #3
Lawrence, KS 66044

Green Killing Golden Goose?

Mr. Green's comments (Hot Cider, Dec.) about the high quality of life in Peterborough, NH, followed by his encouragement that we all rush there to join in its many benefits, present the frustrating dichotomy of how to grow and develop while yet retaining existing benefits.

Either Mr. Green is unbelievably naive, which I doubt, or he stands to gain by any headlong rush of citizens to the Peterborough environs.

Clearly, the natives should muzzle this community booster or suffer "Fast-Foods-Ville" and all the accompanying growth pains.

Thankfully, only nerds and hackers are likely to have read his column, and they are so engrossed in their bits and bytes that the suggested mass movement to the quaint little burg is most unlikely to happen.

In spite of Mr. Green's misplaced

community support, he publishes one fine Apple-oriented magazine. I look forward to each issue with enthusiasm.

Dr. Elbridge Dunckel
7467 US 23 South
Ossineke, MI 49766

Of course I hope to gain. Between new magazines and other projects around here, I need a couple hundred more people than I've been able to find so far. That isn't going to strain the quality of life a whole lot, even in a small town like Peterborough. Also, I am incredibly naive, as you say, but find this an incurable condition because things usually work out for the best no matter how badly I screw them up.

Wayne

inCider's Indecency

As a charter subscriber of *inCider* I have enjoyed the past 12 issues of this magazine. Unfortunately, upon receiving the December 1983 issue a few days ago, I was dismayed to find a full-page advertisement on page 251 that I find in poor taste.

With sexual connotations becoming more and more widespread in our society, I was hoping that computing was one area in which they would not be found. How about giving our young people (and adults) who read your magazine a break—let's omit advertisements and articles of this caliber from future issues of *inCider*.

I will appreciate your consideration of this appeal. Future issues of *inCider* will determine whether or not I renew my subscription. Hopefully, others who wish to keep computing free of morally objectionable material will follow suit.

John R. Pleacher
PO Box 237
Richlands, VA 24641

Bar Code Would Be Welcomed

In the January issue you printed several letters from subscribers about the possibility of printing program listings in bar code. You have no idea how warm your reception by all Ap-

ple owners would be if you were to firstly, investigate present sources for Apple-compatible bar code readers and software, market them yourself as a means to prevent having to type in programs. A price of about \$60-\$70 would be appropriate.

Secondly, print program listings in bar code away from the bulk of the magazine, where they would be distracting. (Maybe in a supplement in the back of the magazine printed on newsprint.)

Although the system would entail some start-up costs for you, I can guarantee that almost every Apple owner I know would be happy to save himself hours of toil typing in programs for a one-time charge plus the price of the magazine. Why, it is even possible or probable that you could start an industry standard in computer publications! Please consider the concept carefully.

Michael Boyd
7201 Derstan Road
Indianapolis, IN 46250

Aid to South America

In The Apple Clinic for January, a letter was published from a reader in Lima, Peru asking for help with an arrow key on an Apple II computer which would not register. While I cannot offer any help in repairing the defective key, I can offer an alternate solution which will make the function of this key available.

CTRL-H can be substituted for the left arrow key and CTRL-U for the right arrow key. This may be a little less convenient than being able to use the arrow keys, but for someone as inept at repairing equipment as I am, it is a lot easier than using a soldering iron!

Abram M. Plum
Illinois Wesleyan University
Bloomington, IL 61701

More on Computer Christmas Cards

As the authors of "Christmas Cards by Computer" (December), we felt it might be helpful to inform all Epson

System Saver® didn't become the Apple's number one selling* peripheral by being just a fan.

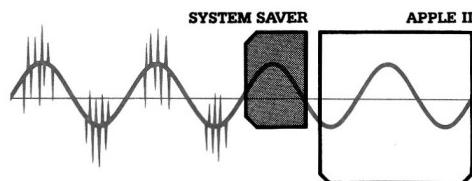
What made over 100,000 Apple® owners fall in love with System Saver? The answer is simple. It's the most versatile, most convenient, most useful peripheral ever made for the Apple.

System Saver filters out damaging AC line noise and power surges.

70-90% of all microcomputer malfunctions can be traced to power line problems** Problems your System Saver guards against.

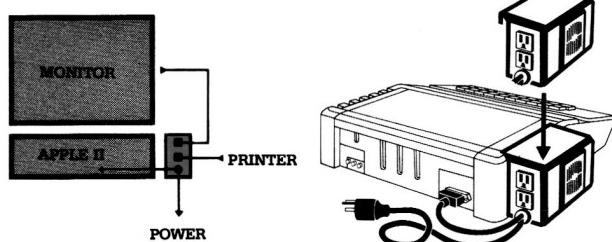
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

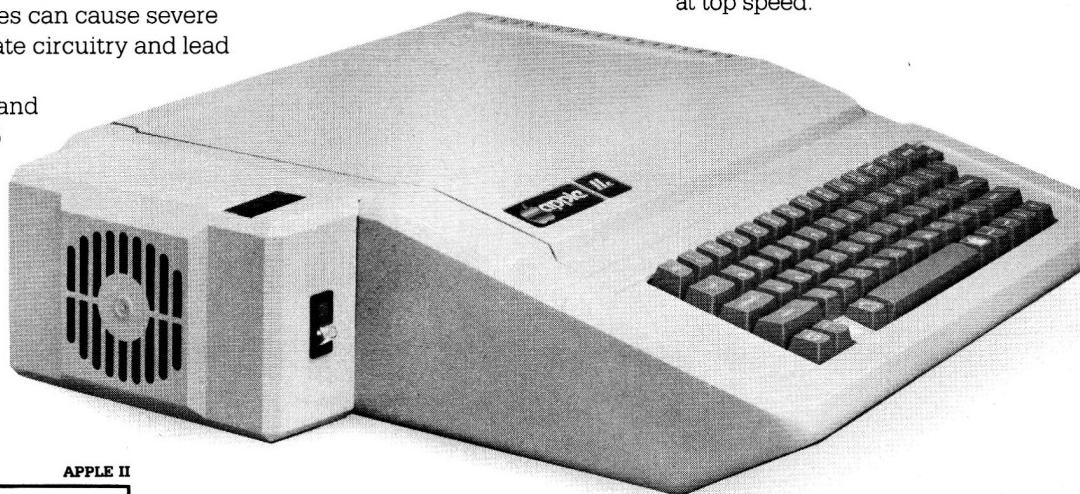
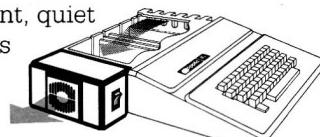


It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.



So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand



\$89.95 at Apple dealers everywhere.

 **KENSINGTON
MICROWARE**

251 Park Avenue South, New York, NY 10010
(212) 486-7707 Telex: 236200 KEN UR

Circle 86 on Reader Service card.

*Softsel Computer Products Hot List. **PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

System Saver is a registered trademark of Kensington Microware Ltd.
© 1983 Kensington Microware Ltd. System Saver is patent pending.

printer owners of the following:

Epson printers, unless very new, are incapable of producing dot-addressable graphics. This is the mode necessary to produce a hi-res screen dump. A retrofit package called Graftax 80 can be purchased to enable the Epson to produce dot-addressable graphics patterns.

The Grappler Printer Interface Card is needed to produce a hi-res screen dump. If you have any other printer interface which is not capable of handling a screen dump, and if you have the Graftax retrofit, you may choose to add a screen dump utility to the Christmas Card program. (*inCider* published such a utility in the March 1983 issue.)

Even with Graftax, the full screen double-sized dump employed by Grappler is too large for the paper, so please use the commands to produce only a single-sized screen dump.

Epson printers also cancel enlarged type with each return. To eliminate the problems caused by this function, all print lines in the card must be immediately preceded by the statement:

PRINT EL\$;

(Note that the statement ends with a semicolon.)

Another last-minute thought: If run on a IIe, the Christmas Card program may error-out in line 15040 if lowercase characters are entered.

We are sorry for any inconvenience that our program may have caused. However, as was stated in the article, the program was written for a specific configuration of equipment. Any changes in that configuration may result in unforeseen problems.

Jeffrey Mills
John Fedak

Flying in the Face of Reason

In your Hot Cider column for January you expressed anguish over Eastern Airlines' ban of the use of PCs on their flights. My first impression was to agree with you. After all, what could one of these electronic gadgets possibly harm?

However, while you have put *your* PC through the tests and found it "quite free from generating interference," I wonder how many other makes and models could make the same boastful statement.

So where does this leave the airlines? Do they inspect every electronic gadget that comes aboard? As a PC owner and a licensed amateur radio operator (N3CNU), I found the news of Eastern's decision regretful. However, from the airline's point of view, and for the safety of all of us who fly, I cannot in good conscience boycott Eastern.

James M. Pershing
257 Spring Valley Road
Jeannette, PA 15644

Yes, James, as more briefcase computers come on the market there is no doubt that some will generate more interference than others. This can be a problem. Unless businessmen put pressure on Eastern to get the FAA to do the needed tests, the FAA is not likely to do anything. But they sure will if Eastern—and a few other airlines—demand action. So let's put the heat on Eastern to break this silly thing loose.

Wayne

Dangerous Advice

Oh Boy! Oh Boy! I'm surprised at you! Publishing an article like "Be a Computer Consultant." "You too can become a professional blaster... all you need is a few sticks of dynamite!" This is a terribly irresponsible article to publish in a magazine read largely by newcomers to computing.

Yes, I am a computer consultant, specializing in Apple products, and have been for six years now. No, I don't want the field all to myself. Yes, Apple products are frequently a cost-effective alternative to "standard" business systems. But...

Consulting is *not* a venture to be entered lightly!!! Remember that as a consultant you're taking the livelihood of someone, or group, and placing it in your own hands. That means you're liable for damages (can be

sued) if your scheme(s) should not be viable. How much do you know about business? (I have over 17 years of business experience.) You must provide (frequently) years of support and maintain an active and deep interest in industry developments. (I spend a small fortune for magazine subscriptions, including yours, though I'm well in advance of most, if not all, of its articles, and maintain industry relations as well.)

Do you *really* keep up with *all* the software? I find that over 90% of the time, a software package already exists for my clients, but I also track these developments through industry reports. Do you have both the patience and expertise to truly advise a stranger on his spending of (an average) \$8000 and all his/her many many revisions of needs? Will the software you write (and you *will* spend the next year or so updating it) handle power outages, finger-smeared disks and neophyte entries? Do you know enough to tell your new client to *keep* doing his old methods *as well as* the new computer methods for at least six months until the kinks are worked out? Do you realize that your client will *not* be forgiving, either of you or the computer, and is not in the least interested in how or why a computer does what it does, but only in improving his/her business? Are you *positive* that an Apple is enough to handle his/her needs, not just now, but for the reasonable future? Are you ready for what will happen to *you* if any of these, or a myriad of other things, goes wrong?

Don't be discouraged, but don't be foolish either... you're putting your own reputation and the livelihood of others on the line.

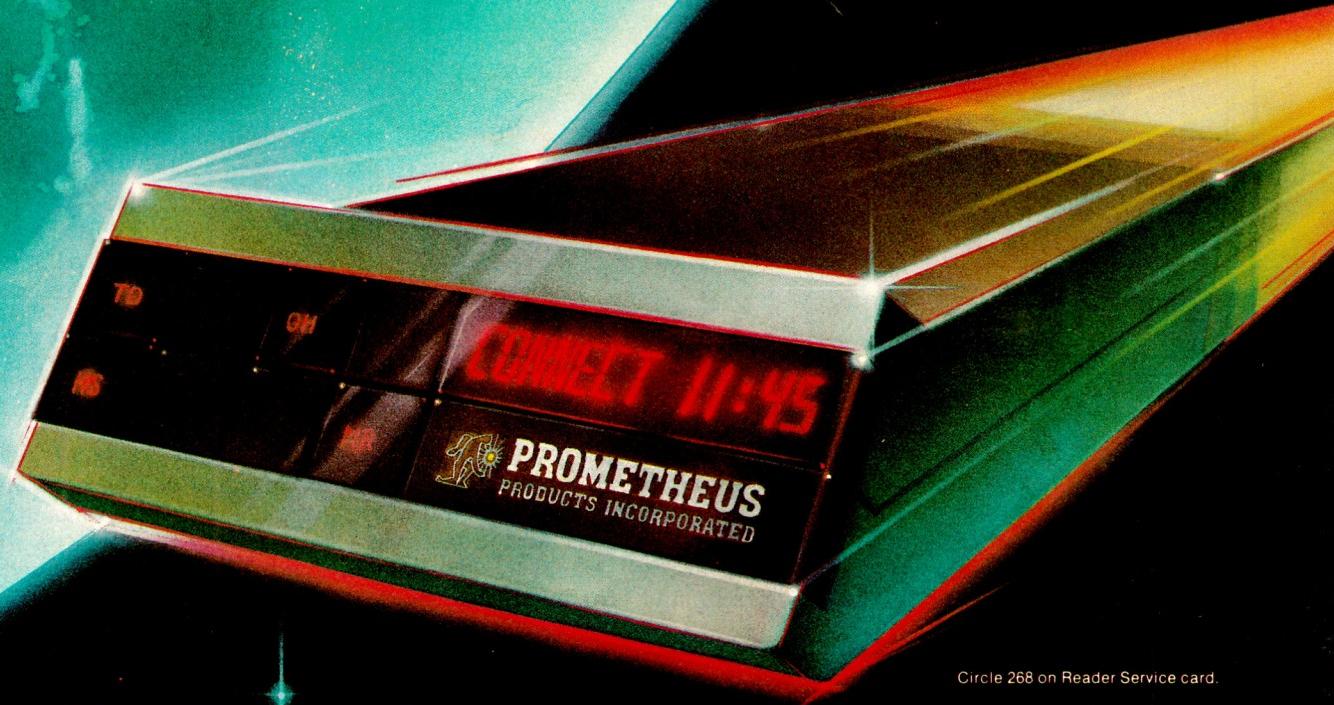
Be a little skeptical, dear readers, when someone says to you:

"You, too, can be a doctor! All you need is a white coat!"

Tracy Valleau
PO Box 834
Pacific Grove, CA 93950

Looks like we'd better cancel the story on do-it-yourself thoracic surgery.—ed.

PRO-MODEM 1200



Circle 268 on Reader Service card.

It's about time.

Time for your computer to make the telephone connection — with an intelligent, full 212A 300/1200 baud modem — with a real time clock/calendar — and with the capability to expand into a complete telecommunications system. It's time for PRO-MODEM 1200. Much more than just a phone modem.

When you're on-line, time is money. PRO-MODEM telecommunication systems help you save. By monitoring the duration and cost of your phone calls. And by sending and receiving messages, unattended, at preset times when the rates are lower. . .with or without your computer.

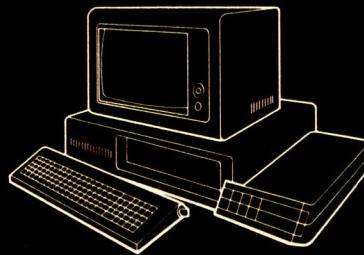
Compare the \$495 PRO-MODEM 1200 with any other modem on the market. For example, you'd have to buy both the Hayes Smartmodem 1200 plus their Chronograph for about \$950 to get a modem with time base.

PRO-MODEM 1200 is easy to use. A convenient "Help" command displays the Menu of operating command choices for quick reference whenever there's a question about what to do next. Extensive internal and remote self-diagnostics assure that the system is operating properly. Some of the other standard features include Auto Answer, Touch Tone and Pulse Dialing, and Programmable Intelligent Dialing.

PRO-MODEM does more. It lets you build a full telecommunications system with features like Auto Dialer, Incoming and Outgoing Message Buffering, Business/Personal Phone Directory, Programmable Operating Instructions, a 12-Character Alpha-Numeric Time and Message Display, and versatile PRO-COM Software. PRO-MODEM commands are Hayes compatible so you can use most existing telecommunications software without modification.

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PROMETHEUS

The Applesoft Adviser

by Dan Bishop



Hi-Res Alphabet Soup

I frequently receive requests for a column explaining how alphanumeric text can be mixed with graphics characters on a high-resolution screen. After all, diagrams, charts and illustrations are much more

meaningful when text can be used at appropriate places within the display. Apple users have been forced to content themselves with a text window at the bottom of the hi-res screen, and, barring heroic efforts,

this mixing of graphics window and text window can be done only with page 1. I devoted last month's column to describing how the "mixed mode" could be accomplished with hi-res page 2, but if you followed my description there you have to agree that mixed text and graphics (as separate windows) is not easily accomplished with that page.

This month I'll go one better and provide the subroutines and data statements necessary to easily mix text anywhere on a hi-res screen. The technique is as easily applicable to page 2 as to page 1, and works with the Apple II as well as the IIe. Having achieved this capability, you may never be satisfied with the mixed mode, with its separate windows, again. No knowledge of assembly language or machine code is necessary. Everything is handled with Basic!

The techniques that I use here can be applied to many situations. By altering the data statements, you can get your Apple to print other alphabets on the screen. In fact, Listing 3 produces a full set of Cyrillic (Russian) characters to illustrate just how versatile these subroutines are. If you enjoy working with floor plans, you may wish to define letter keys to produce graphic symbols for items of furniture. Engineering designs, electronics diagrams, chemical formulas—all can profit from these concepts.

***Listing 1. Standard Keyboard.** This program defines the complete keyboard character set and pokes the definitions into RAM just below the hi-res page 1 memory buffer. This program must be run before the program in Listing 2. Except for the two messages, you will see no apparent changes as a result of running this program.*

```
5 HIMEM: 6999
10 HOME
20 VTAB 12
30 PRINT "LOADING CHARACTER DEFINITIONS INTO RAM."
40 GOSUB 1200
50 PRINT : PRINT " FINISHED "
60 END
1200 READ VN,VK
1210 FOR VI = 0 TO VN - 1
1220 READ V
1230 FOR VJ = 0 TO 7
1240 READ VV
1250 POKE V + VK + VJ, VV
1260 NEXT VJ,VI
1270 RETURN
1290 DATA 66,7000
1300 DATA 320,0,0,0,0,0,0,0: REM BLANK
1305 DATA 330,4,14,14,4,0,4,4,0: REM !
1310 DATA 340,10,10,0,0,0,0,0,0: REM "
1315 DATA 350,10,10,31,10,31,10,10,0: REM #
1320 DATA 360,4,30,5,14,20,15,4,0: REM $
1325 DATA 370,3,19,8,4,2,25,24,0: REM %
1330 DATA 380,2,5,5,2,21,9,22,0: REM &
amp;
1335 DATA 390,4,4,4,0,0,0,0,0: REM '
1340 DATA 400,4,2,1,1,1,2,4,0: REM (
1345 DATA 410,4,8,16,16,16,8,4,0: REM )
1350 DATA 420,4,21,14,4,14,21,4,0: REM *
1355 DATA 430,0,4,4,31,4,4,0,0: REM +
1360 DATA 440,0,0,0,0,8,8,4,0: REM ,
1365 DATA 450,0,0,0,31,0,0,0,0: REM -
1370 DATA 460,0,0,0,0,0,0,4: REM .
1375 DATA 470,0,16,8,4,2,1,0,0: REM /
1380 DATA 480,14,17,17,17,17,17,14,0: REM 0
1385 DATA 490,4,6,4,4,4,4,14,0: REM 1
1390 DATA 500,14,17,16,16,12,3,31,0: REM 2
```

Listing continued.

Address correspondence to Dan Bishop, c/o Custom Comp, PO Box 429, Buena Vista, CO 81211.

Listing continued.

```

1395 DATA 510,15,16,16,12,16,16,15,0: REM 3
1400 DATA 520,12,10,9,9,31,8,8,0: REM 4
1405 DATA 530,31,1,1,15,16,16,15,0: REM 5
1410 DATA 540,30,1,1,15,17,17,14,0: REM 6
1415 DATA 550,31,8,4,2,1,1,1,0: REM 7
1420 DATA 560,14,17,17,14,17,17,14,0: REM 8
1425 DATA 570,14,17,17,30,16,8,7,0: REM 9
1430 DATA 580,0,0,4,0,4,0,0,0: REM :
1435 DATA 590,0,0,4,0,4,4,2,0: REM ;
1440 DATA 600,16,8,4,2,4,8,16,0: REM <
1445 DATA 610,0,0,31,0,31,0,0,0: REM =
1450 DATA 620,2,4,8,16,8,4,2,0: REM >
1455 DATA 630,14,17,8,4,4,0,4,0: REM ?
1460 DATA 640,14,17,21,29,13,1,30,0: REM @
1465 DATA 650,4,10,17,17,31,17,17,0: REM A
1470 DATA 660,15,17,17,15,17,17,15,0: REM B
1475 DATA 670,14,17,1,1,1,1,17,14,0: REM C
1480 DATA 680,15,17,17,17,17,17,15,0: REM D
1485 DATA 690,31,1,1,7,1,1,31,0: REM E
1490 DATA 700,31,1,1,7,1,1,1,0: REM F
1495 DATA 710,14,17,1,1,29,17,30,0: REM G
1500 DATA 720,17,17,17,31,17,17,17,0: REM H
1505 DATA 730,14,4,4,4,4,4,14,0: REM I
1510 DATA 740,28,8,8,8,9,6,0: REM J
1515 DATA 750,17,9,5,3,5,9,17,0: REM K
1520 DATA 760,1,1,1,1,1,1,31,0: REM L
1525 DATA 770,17,27,21,17,17,17,17,0: REM M
1530 DATA 780,17,17,19,21,25,17,17,0: REM N
1535 DATA 790,14,17,17,17,17,17,14,0: REM O
1540 DATA 800,15,17,17,15,1,1,1,0: REM P
1545 DATA 810,14,17,17,17,21,9,22,0: REM Q
1550 DATA 820,15,17,17,15,5,9,17,0: REM R
1555 DATA 830,14,17,1,14,16,17,14,0: REM S
1560 DATA 840,31,4,4,4,4,4,4,0: REM T
1565 DATA 850,17,17,17,17,17,17,14,0: REM U
1570 DATA 860,17,17,27,10,14,4,4,0: REM V
1575 DATA 870,17,17,17,21,27,17,0: REM W
1580 DATA 880,17,27,14,4,14,27,17,0: REM X
1585 DATA 890,17,17,10,4,4,4,4,0: REM Y
1590 DATA 900,31,16,8,4,2,1,31,0: REM Z
1595 DATA 910,7,1,1,1,1,1,7,0: REM LEFT BRACKET
1600 DATA 920,0,1,2,4,8,16,0,0: REM BACK SLASH
1605 DATA 930,28,16,16,16,16,16,28,0: REM RT. BRA
CKET
1610 DATA 940,4,10,17,0,0,0,0,0: REM CARROT
1615 DATA 950,0,0,0,0,0,0,31: REM UNDERLINE
1620 DATA 00,31,31,31,31,31,31,0: REM BLOCK
1625 DATA 10,127,127,127,127,127,127,127: REM
    FULL BLOCK

```

Listing 2. Hi-Res and Text Demo. This program will operate properly only if either Listing 1 or Listing 3 has been run first. If using Listing 3 for the character definitions, remove line 15 from this program. This program contains the subroutines and procedures needed to access and display symbols and characters stored in RAM so that they appear on the hi-res screen.

```

5 HIMEM: 6999
10 HGR : HOME : VTAB 21:VK = 7000: HCOLOR= 3
15 GOSUB 200
20 PRINT "ENTER A SHORT PHRASE..."
30 INPUT R$
40 PRINT "WHAT LOCATION (BETWEEN 8192 AND 9208)?"
50 INPUT VY
60 IF VY > 8191 AND VY < 9208 THEN GOTO 100
70 PRINT "THAT IS AN UNACCEPTABLE ADDRESS."
80 PRINT "PRESS <C> TO CONTINUE...": GET X$
90 IF X$ = "C" THEN 10
95 GOTO 80
100 GOSUB 1000

```

Listing continued.

Tools for Creating Text

The process that I have employed for creating text or symbolic images on the hi-res screen involves five steps. They are:

- 1) Define the images for the characters or symbols in terms of a memory location reference and an eight-number sequence. For example, the letter H might be defined as: DATA 720,17,17,17,31,17,17,17,0:REM H.
- 2) Poke the entire character set into RAM memory using Basic POKE commands. (See lines 1200–1270 in Listings 1 and 3.)
- 3) When ready to print characters on the screen, select those desired using the technique illustrated in lines 1000–1050 in Listing 2.
- 4) Obtain the number sequence for the desired symbol or character from its location in RAM. (See lines 1100, 1110 and 1130 in Listing 2.)
- 5) Poke the number sequence into the appropriate screen buffer location for display with hi-res graphics. (See lines 1100, 1120 and 1130 in Listing 2.)

Storage Locations

In addition to these five steps, a few additional minor details need to be addressed. First, you must decide on an area of RAM to use for storing the character definitions. If your program is not too long, you can reserve the space below page 1 of the hi-res screen buffer. This is what I have done in my examples. The first page 1 address is 8192. Using the techniques described in this article, each character requires ten bytes for storage, so 1192 bytes will store 119 characters. Since this is more than I planned to use, I decided to begin storing the character definitions at location 7000. To protect both my character definition storage area and my hi-res graphics screens from being clobbered by Basic, the first line that you see in Listing 2 is: 5 HIMEM : 6999. With that command restricting the memory used by Basic, I know that my character definitions will be safe.

On the other hand, if your program needs this area of RAM, you may wish to store your character def-

Listing continued.

```
110 POKE - 16302,0
120 VY = 9170
130 R$ = "PRESS <RET> TO CONTINUE; X TO END...""
140 GOSUB 1000
150 GET X$
160 IF X$ = "X" THEN TEXT : HOME : END
170 GOTO 10
200 HPLOT 30,30 TO 40,30 TO 40,90 TO 30,90 TO 30,30
210 FOR X = 1 TO 250: HPLOT X,20 * LOG (X): NEXT X
220 R$ = "<-- BOX":VY = 8711: GOSUB 1000
230 R$ = "Y=20*LOG(X) --->""
240 VY = 8744: GOSUB 1000
250 RETURN
990 R$ = RIGHTS (" " + STR$ (N),5)
1000 FOR R = 1 TO LEN (R$)
1010 R1$ = MID$ (R$,R,1)
1020 V = ASC (R1$) * 10
1030 GOSUB 1100
1040 NEXT R
1050 RETURN
1100 FOR VJ = 0 TO 7
1110 VV = PEEK (VK + V + VJ)
1120 POKE VY + 1024 * VJ,VV
1130 NEXT VJ
1140 VY = VY + 1
1150 RETURN
```

Listing 3. Cyrillic Alphabet. This program defines the entire Russian alphabet and pokes these definitions into RAM just below the hi-res page 1 memory buffer.

```
5 HIMEM: 6999
10 HOME
20 VTAB 12
30 PRINT "LOADING CHARACTER DEFINITIONS INTO RAM."
40 GOSUB 1200
50 PRINT : PRINT " FINISHED "
60 END
1200 READ VN, VK
1210 FOR VI = 0 TO VN - 1
1220 READ V
1230 FOR VJ = 0 TO 7
1240 READ VV
1250 POKE V + VK + VJ, VV
1260 NEXT VJ, VI
1270 RETURN
1290 DATA 66,7000
1300 DATA 320,0,0,0,0,0,0,0: REM BLANK
1305 DATA 330,4,14,14,4,0,4,4,0: REM !
1310 DATA 340,10,10,0,0,0,0,0,0: REM "
1315 DATA 350,10,10,31,10,31,10,10,0: REM #
1320 DATA 360,0,0,1,1,15,9,15,0: REM
1325 DATA 370,3,19,8,4,2,25,24,0: REM *
1330 DATA 380,14,17,16,30,16,17,14,0: REM
1335 DATA 390,4,4,4,0,0,0,0,0: REM '
1340 DATA 400,4,2,1,1,1,2,4,0: REM (
1345 DATA 410,4,8,16,16,16,8,4,0: REM )
1350 DATA 420,21,21,31,14,14,21,21,0: REM
1355 DATA 430,0,4,4,31,4,4,0,0: REM +
1360 DATA 440,0,0,0,0,8,8,4,0: REM ,
1365 DATA 450,0,0,0,31,0,0,0,0: REM -
```

Listing continued.

itions above the hi-res graphics screen buffer areas that your program uses. In either case, all programs need to be informed as to the starting location for character definition storage. In Listings 1 and 3, this value is the second data element, read into the program as VK (line 1290). (The first data element in line 1290 is the number of character definitions to be read in—66 in the case of Listings 1 and 3.) In Listing 2, the same variable, VK, must be assigned the same value, and this is done in line 10.

A second point to be made is that the command HGR automatically sets up the screen in mixed mode, with the bottom four lines devoted to a text window. In most cases you will want a full-screen display, since there are no longer restrictions as to where text can appear. The command in line 110 of Listing 2, POKE - 16302,0, makes the graphics screen display switch from mixed mode to full-screen graphics. Listing 2 uses the mixed mode to obtain user input (lines 20–50) and then switches to full-screen graphics for the final display.

One interesting benefit to using protected areas of RAM to store character definitions is that, once the definitions have been poked into RAM, they remain there even as other programs are loaded and run. This means that a separate program can be used to read and store the character definitions and that the program or programs that use those definitions do not themselves have to contain the coded information. So, in order to use the examples in this article, you must first run *either* Listing 1 or Listing 3 to store the character definitions in RAM. Then run Listing 2, which uses the previously stored characters. (Incidentally, if you run the program in Listing 2 with the Cyrillic characters in RAM storage, remove line 15 from the program. Otherwise the labels that appear on the screen will look unusual, to say the least!)

Defining the Character

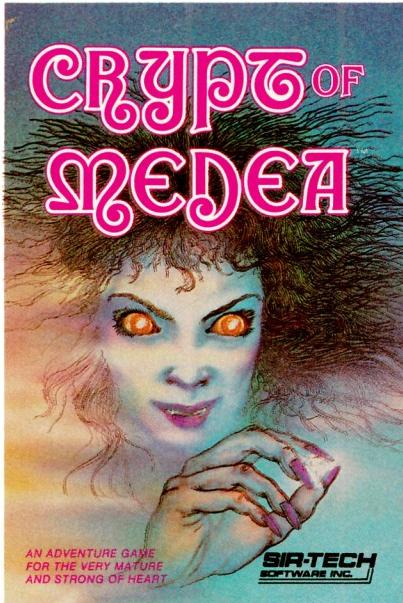
Figure 1 shows the screen break-

Circle 218 on Reader Service card.

The SIR-TECH Standard:

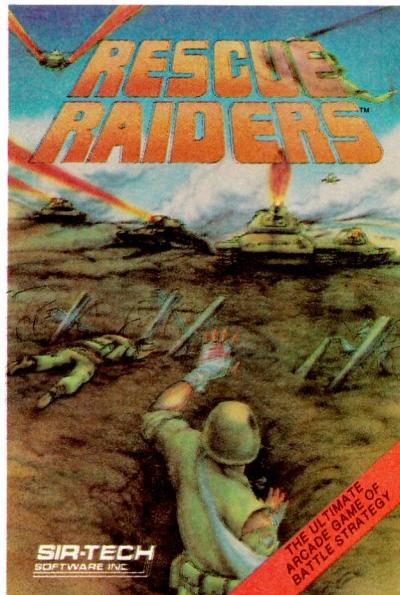
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As you search for freedom, you will test your courage and challenge your problem solving ingenuity.



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Modern weapons have been transported back in time to World War II and both sides have mind-boggling capabilities. There is no guaranteed winner this time around.

From a command chopper, you must coordinate your ground forces against a force as complex and strong as yours. You must mastermind a strategy with infantry, tanks, bunkers, bases, balloon mines and much more!

The fate of the world is in your hands as you struggle to liberate the European continent, and save the free world! Learn to develop your survival instincts and win over an equal enemy because right is on your side!

This terror filled adventure game begins on a dark, stormy night. You find refuge in the only available shelter-- an eerie mausoleum. Suddenly you are trapped in MEDEA's forbidden tomb.

All the dangers and horrors you ever imagined await you in the hidden passages and secret rooms of MEDEA's crypt. You strain your intellect and match wits with MEDEA's ghoulish obstacles and secrets of the deep passages. You may escape with your life... or face eternal entombment in the CRYPT OF MEDEA.

SIR-TECH

SOFTWARE INC.

down for the hi-res screen buffers. Notice that each row contains 40 boxes, and that there are 24 rows. The screen location of the first box in each row is shown along the left edge of the illustration. The first column of numbers refers to locations in the page 1 buffer, and the second column to the page 2 buffer. Please note that these numbers are not sequential from top to bottom. They cycle in groups of eight rows. So, for page 1 location 8192 represents the upper left box in the grid, location 8232 represents the first box in the ninth row, and location 8272 represents the first box in the 17th row, even though these three numbers differ by only 40. If you refer to the diagram in Figure 1, however, this detail need not concern you.

The important feature for defining your own characters is that each box in this grid is itself broken down into a 7-column-by-8-row grid (Figure 2). Each symbol or character that you plan to define will be formed by filling appropriate boxes in this 7-by-8 grid with a dot or pixel. Figure 3 shows how the letter A might be defined. Note that, for this letter, columns 6 and 7 and row 8 (the bottom row) have been left blank. This is only to allow for spacing between letters and rows of print. There is absolutely no reason for not using these boxes as well, should your symbol require it. In fact, if your symbol needs two or more adjacent locations on the screen, you would want to fill these columns so that there would be no gap between the two locations showing up in the middle of your symbol. The bottom row is also useful for letters requiring descenders.

Row-Values

The first step, then, in defining your characters is to get a piece of graph paper and block off squares containing seven columns and eight rows. Next, sketch in the symbol you want to use by filling in appropriate boxes in the grid. When you are satisfied with the appearance of the symbol or character, you must calculate a "row-value" for each of

Listing continued.

```
1370 DATA 460,0,0,0,0,0,0,0,4: REM .
1375 DATA 470,0,16,8,4,2,1,0,0: REM /
1380 DATA 480,14,17,17,17,17,17,14,0: REM 0
1385 DATA 490,4,6,4,4,4,4,14,0: REM 1
1390 DATA 500,14,17,16,16,12,3,31,0: REM 2
1395 DATA 510,15,16,16,12,16,16,15,0: REM 3
1400 DATA 520,12,10,9,9,31,8,8,0: REM 4
1405 DATA 530,31,1,1,15,16,16,15,0: REM 5
1410 DATA 540,30,1,1,15,17,17,14,0: REM 6
1415 DATA 550,31,8,4,2,1,1,1,0: REM 7
1420 DATA 560,14,17,17,14,17,17,14,0: REM 8
1425 DATA 570,14,17,17,30,16,8,7,0: REM 9
1430 DATA 580,0,0,4,0,4,0,0,0: REM :
1435 DATA 590,0,0,4,0,4,4,2,0: REM ;
1440 DATA 600,10,4,17,25,21,19,17,0: REM SHORT I
1445 DATA 610,0,0,31,0,31,0,0,0: REM =
1450 DATA 620,10,0,31,1,15,1,31,0: REM LONG E
1455 DATA 630,14,17,8,4,4,0,4,0: REM ?
1460 DATA 640,30,17,17,30,20,18,17,0: REM YA
1465 DATA 650,4,10,17,17,31,17,17,0: REM A
1470 DATA 660,31,1,1,15,17,17,15,0: REM B
1475 DATA 670,17,17,17,30,16,16,16,0: REM CH
1480 DATA 680,14,10,10,10,10,31,17,0: REM D
1485 DATA 690,31,1,1,7,1,1,31,0: REM E
1490 DATA 700,4,14,21,21,14,4,00: REM F
1495 DATA 710,31,1,1,1,1,1,1,0: REM G
1500 DATA 720,0,0,17,17,31,25,31,0: REM
1505 DATA 730,17,17,25,21,19,17,17,0: REM I
1510 DATA 740,17,17,17,17,17,17,63,48: REM TSEH
1515 DATA 750,17,9,5,3,5,9,17,0: REM K
1520 DATA 760,28,20,20,20,20,21,23,0: REM L
1525 DATA 770,17,27,21,17,17,17,17,0: REM M
1530 DATA 780,17,17,17,31,17,17,17,0: REM N
1535 DATA 790,14,17,17,17,17,17,14,0: REM O
1540 DATA 800,31,10,10,10,10,10,10,0: REM P
1545 DATA 810,17,17,21,21,21,21,63,48: REM SHCH
1550 DATA 820,15,17,17,15,1,1,1,0: REM R
1555 DATA 830,14,17,1,1,1,1,17,14,0: REM S
1560 DATA 840,31,4,4,4,4,4,4,0: REM T
1565 DATA 850,29,21,21,23,21,21,29,0: REM YOU
1570 DATA 860,15,17,17,15,17,17,15,0: REM V
1575 DATA 870,17,17,21,21,21,21,31,0: REM SH
1580 DATA 880,17,27,14,4,14,27,17,0: REM X
1585 DATA 890,17,17,18,20,12,4,3,0: REM Y
1590 DATA 900,14,17,16,12,16,17,14,0: REM Z
1595 DATA 910,7,1,1,1,1,1,7,0: REM LEFT BRACKET
1600 DATA 920,0,1,2,4,8,16,0,0: REM BACK SLASH
1605 DATA 930,28,16,16,16,16,16,28,0: REM RT. BRA
CKET
1610 DATA 940,0,0,3,2,30,18,30,0: REM
1615 DATA 950,0,0,0,0,0,0,31: REM UNDERLINE
1620 DATA 00,31,31,31,31,31,31,31,0: REM BLOCK
1625 DATA 10,127,127,127,127,127,127,127,127: REM FULL BLOCK
```

the eight rows of boxes in the grid.

Figure 4 shows a typical 7-by-8 grid with a series of numbers along the top—one number for each column. To find the row-value for a given row, scan along the row and if

a box is filled in, write down the number that appears at the top of that particular column. Do this clear to column 7, and add up all of the numbers you have written down. The resulting sum is the row-value

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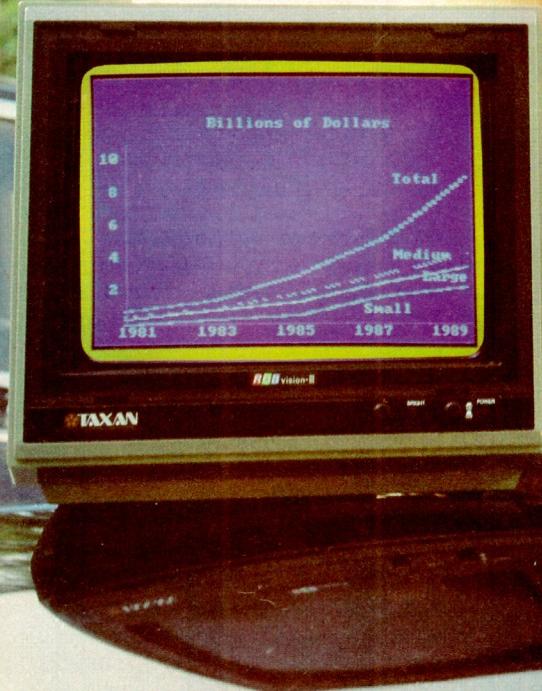
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for that row. This number will also be the first number in an eight-number sequence that defines the symbol. Each of the eight rows will have its own row-value. Work from the top down. Figure 4 shows the row-values obtained using the example along the right edge of the figure.

If you want practice in determining row-values for various symbols, use Listing 1. Each data statement contains a remark indicating which character that statement defines. Ignore the first number in the sequence (a location number, explained below), but take each of the next eight numbers and use them as row-values that tell which boxes to fill in for each seven-column row. With this practice, before long you

will be able to define your own characters with ease.

Location Numbers

All that remains to complete each character definition is the location number, the first number in the data statement. As mentioned earlier, the character definition storage area I chose for these examples begins at RAM location 7000. It would have been possible to assign values of 7000, 7010, 7020, etc., to each character in succession. However, I opted to specify locations relative to the starting point of 7000. So, the first character in my character set has a relative location of 00, the second a relative location of 10, the third 20, and so on, with one interesting but

extremely useful twist.

As you probably know, each computer keyboard character has a code number associated with it known as its ASCII code. The blank space, for example, has a code value of 32, and the letter A has a code value of 65. Basic allows you to find the ASCII code for any given character, such as whatever character might currently be associated with the variable R1\$, by using the command V = ASC(R1\$). So, if R1\$ had a value of A, then V

Screen Location
for First Box in
Each Row

Page 1 Page 2

40 columns by 24 rows

8192	16384
8320	16512
8448	16640
8576	16768
8704	16896
8832	17024
8960	17152
9088	17280
8232	16424
8360	16552
8488	16680
8616	16808
8744	16936
8872	17064
9000	17192
9128	17320
8272	16464
8400	16592
8528	16720
8656	16848
8784	16976
8912	17104
9040	17232
9168	17360

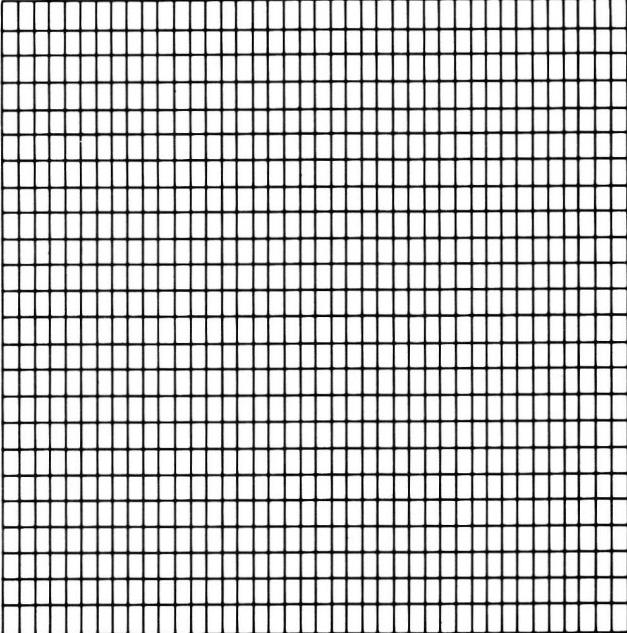


Figure 1. Hi-res graphics screen buffer. Each box in this grid contains a matrix of 7 columns by 8 rows and each of the 56 resulting locations can contain a single pixel or dot for display. The numbers to the left correspond to the screen location, for page 1 and page 2, for the first box in each row. To determine where you want your message to appear, refer to this chart. Find the row you want to display your character in, select the appropriate number above, and count over to the desired column. For example, to position a character in the tenth column of the second row of hi-res page 1, you would set VY equal to 8329.

Columns

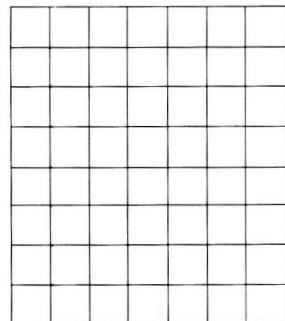


Figure 2. Each character position (represented by a single box in Figure 1) is actually composed of a grid containing 7 columns and 8 rows.

Columns

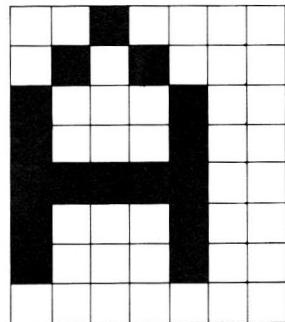


Figure 3. The letter A as it might be represented in one 7-column-by-8-row character grid. Note the blank columns (to space the letters apart) and the blank bottom row for line spacing. The character definition for this figure would be 4,10,17,17,31,17,17,0 (see Figure 4).

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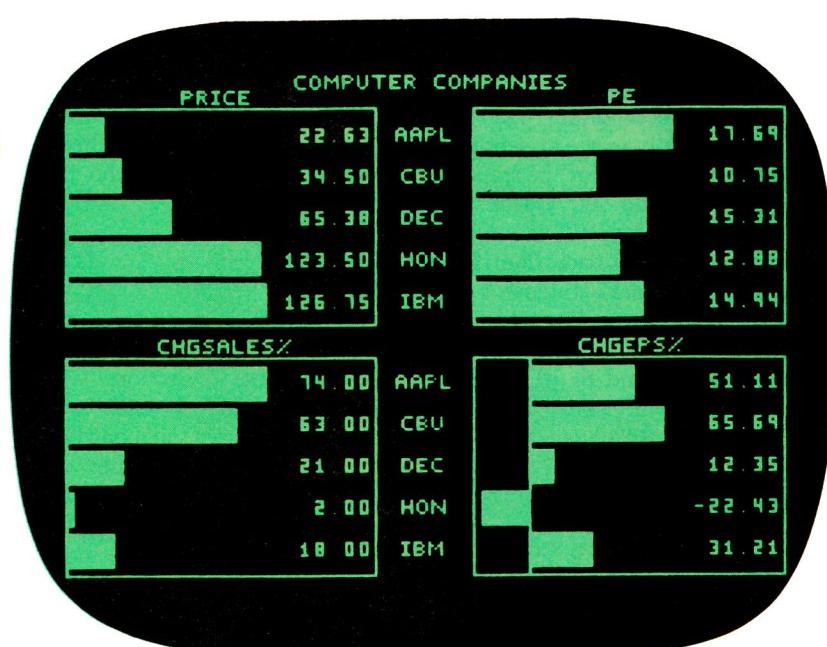
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would come out with a value of 65. Now, if you just happened to store the character definition to be associated with the letter A at RAM location 650 (relative to 7000), the computer could automatically calculate the location of that character's definition by multiplying its ASCII value by 10!

Most microcomputer manuals have a list, usually in the appendix, of the ASCII codes used for the standard keyboard character set. Check Listing 1 and compare the location code (the first number in each data statement) and the remark statement with the ASCII codes in such a table. You will find that the location codes in Listing 1 correspond to 10 times the appropriate ASCII code, beginning with 320 for the blank space (character definition eight zeros, of course) and continuing on past 900 for Z (ASCII code 90).

Now look closely at lines 1200–1270 in Listing 1. First, the total number of symbols to be defined is read as VN, and then the starting memory location for character definition storage as VK. A loop is set up in line 1210 to read the VN character definitions into RAM. The first element read is, of course, the location

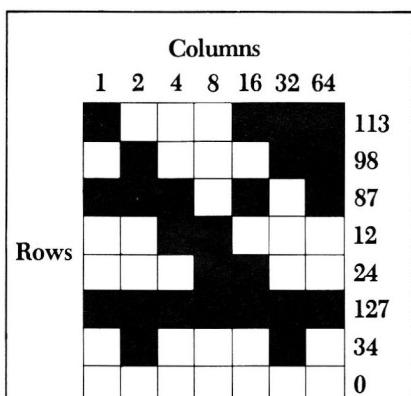


Figure 4. A nonsense symbol to illustrate the determination of row-values and character definitions. The definition, 113,98,87,12, 24,127,34,0 here, is composed of the eight row-values (listed from top to bottom). Each row-value is determined by summing the column values for the filled boxes in that row.

value, as V. Then a second loop reads in each of the eight row-values that define the character. Each row-value is read as VV and then poked into address V + VK + VJ, where VJ has successive values of 0, 1, 2...7. So the blank space, with a relative location of 320, gets stored in RAM locations $320 + 7000 + 0$ through $320 + 7000 + 7$. This process is repeated until all of the character definitions have been stored, at which time the program ends.

Displaying Text on a Hi-Res Screen

Once the characters (or symbols) have been tucked away in RAM, you can use these definitions with any program needed. If each symbol is associated with a keyboard character, then the subroutines at lines 1000–1050 and 1100–1150 in Listing 2 will be sufficient to call up the symbol and display it on the screen. All you must do before using the subroutines is give the keyboard character or

characters to R\$ and specify a screen location as VY (referring to Figure 1). For example, to print HAPPY ST. PATRICK'S DAY in the middle of the screen, use the following three commands:

```
R$ = "HAPPY ST. PATRICK'S DAY"
VY = 8749 : VK = 7000: HGR
GOSUB 1000
```

The subroutine at lines 1000–1050 in Listing 2 accomplishes two tasks. First it extracts a single letter from the R\$ string that contains the text or symbolic "message" to be displayed. It then calculates a location value V from this character, based on its ASCII code.

Subroutine 1100 is then called. Using the value calculated for V and the base location value VK (7000 in these examples), it peeks out the eight row-values that correspond to the symbol currently under consideration. Next, each row-value is used as it is extracted to poke the appropriate row image into the hi-res screen buff-

A	A	K	K	X	X
Б	В	Л	Л	҃	Ј
В	В	М	М	҆	С
Г	Г	Н	Н	҈	Ѡ
Д	Д	О	О	҉	҂
Е	Е	П	П	Ҋ	ѧ
Е	>	Р	Р	Ҍ	Ҥ
Ж	*	С	С	Ҏ	\$
З	Z	҈	҈	ҏ	&
И	I	҉	҉	ҍ	Ւ
		Փ	Փ	Ҏ	@

Figure 5. The keyboard characters on the Apple as they are redefined to correspond to Cyrillic (Russian) alphabet characters in Listing 3. Many of the correlations are phonetic while others are random. Cyrillic in the left columns, Apple keyboard in the right.

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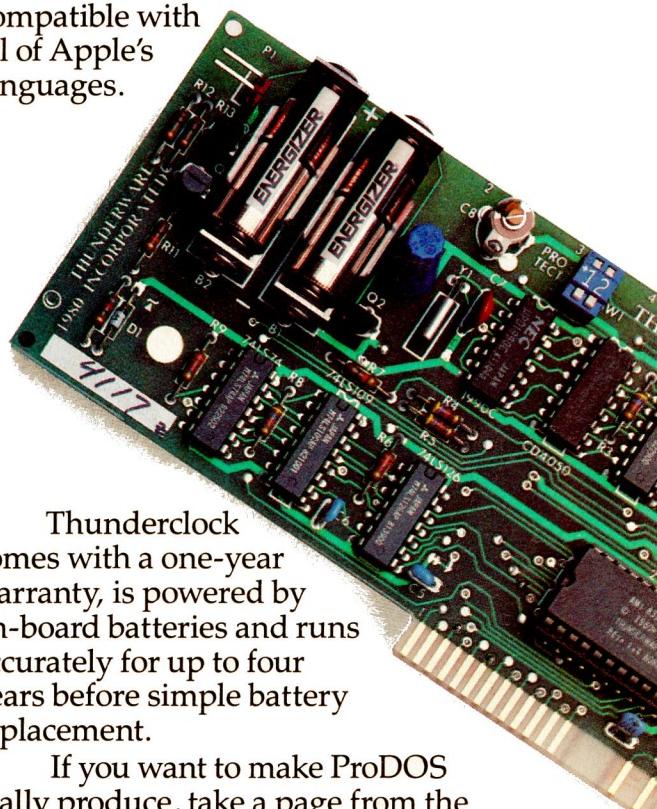
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Plain Talk About Printers...

Dot Matrix

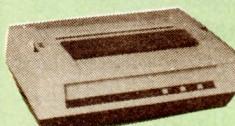
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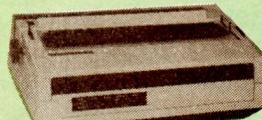
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er, using the screen location VY that you have assigned. Before returning to the subroutine at 1000 to get the next letter in the screen, the value of VY is incremented by one so that the next letter obtained will be printed next to this letter, rather than on top of it.

Since the process uses peeks and pokes, it is not particularly fast. But then you probably wouldn't intend to use this technique as a word processor anyway! This example uses only assignment statements to provide the string values of R\$ for display, but you can also get interactive keyboard characters to be displayed as well. Rather than use the INPUT command, set up the following loop that uses the GET command. Each time a key is pressed, its ASCII value is determined. If the value is 13, a RETURN, then the program leaves the loop. Any other character sends the computer to the subroutine at 1000 (Listing 2) to display the character on the screen. Be sure to assign VY an appropriate value first!

```
300 GET R$  
310 IF ASC(R$)=13 THEN 330  
320 GOSUB 1000: GOTO 300  
330 RETURN
```

Numeric information must first be converted to string data before the subroutine at 1000 can use it. This is handled by line 990, which converts the number (as N) into R\$, a string having five digits (or preceding blanks). From that point, everything works the same as before. Thus, if you want to display a numeric value on the screen, set N equal to the desired number and GOSUB 990 rather than 1000.

The Russian Apple

Listing 3 is similar to Listing 1 in appearance, but if you were to run it and then use a program, such as the one in Listing 2, that refers to the character definitions stored by Listing 3, you could be quite surprised at the result. Each keyboard character is redefined to correspond to a character in the Cyrillic alphabet. So, instead of generating the message PRESS (RETURN) TO CONTINUE: X TO

END... from Listing 2, a string of characters in which only the E, O, and X remained the same would appear. Figure 5 lists the Cyrillic characters and the keys on the Apple keyboard that display each character. Of course, any English character string defined as R\$ will be displayed as the corresponding Cyrillic character. The English keys that represent the Russian characters were determined only by my own whim. However, I tried to be somewhat logical, using phonetics as a guide wherever possible. Thus the Russian B, which sounds like V in English, is displayed on the screen by the keyboard character V. Of course, since there are more letters

"I tried to be somewhat logical, using phonetics as a guide wherever possible."

in the Russian alphabet, I had to make use of some of the special symbols available on the Apple. The \$, &, *, <, >, ^ and @ symbols are all redefined as Cyrillic alphabetic characters.

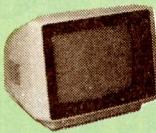
This character set may be useful to anyone teaching or learning the Russian language. But in a broader sense, the appearance of the data statements in Listing 3 should be helpful to further illustrate how character definitions can be devised and may encourage you to experiment with letters or symbols of your own.

If you want to play a trick on someone, reverse the location values in the standard keyboard character set (so that A is at 900 and Z is at 650), run the program to store the character definitions, then set up your keyboard entry program and leave the computer on with the graphics screen display. Watch the confusion and consternation as your victim types a message, only to see the letters come out as total nonsense. ■

Monitors

NEC

JB-1205M

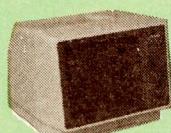


NEC's JB-1205M (amber) has an 18MHz bandwidth on 80 column by 24 line (12" diagonal screen). The JB-1201 is the green screen version.

JB-1205M (amber) \$179.88

JB-1201M (green) \$169.88

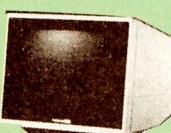
AMDEK



300 (12" green) \$149.88
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US ROBOTICS

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The Micromodem IIe is an originate/answer, auto dial/answer, full/half duplex internal modem for the Apple/Franklin systems. It includes a communications package (Smartcom I), modem board, cables & complete documentation. A superior product. **Micromodem IIe** \$259.88

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If you've already got 64K RAM (Franklin or IIe), get the Z80/Softcard Combo. Same spec's, but without 16K RAMcard. Z80/Videoterm Combo \$444.88

Z80 Softcard \$249.88
16K RAMcard \$69.88

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The Accelerator II's high-speed 6502 processor & 64K memory makes an Apple II run 3½ times faster. Comes with pre-boot. Accelerator II \$479.88

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The VideoTerm produces an 80-column display. Soft switch lets you toggle between 40 or 80 columns. Upper/lower case, CP/M™ & Pascal compatible.

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VideoTerm w/switch \$229.88
VideoTerm w/o switch \$209.88
Enhancer II \$109.88

UltraTerm

UltraTerm takes VideoTerm one step further: it produces 160 columns, as well as 80 columns, with upper/lower case. UltraTerm \$289.88

RANA SYSTEMS

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The Elite-1's are single-sided, with 163K storage, 84ms access time & 13 or 16 sectoring. The Controller Card can run four drives—Apples, Rana's or whatever—in any combination. The Elite-2's are double-sided drives, Elite-3's are 80 track drives.

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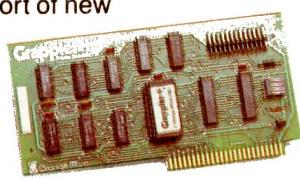
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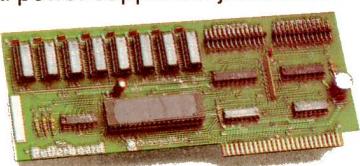
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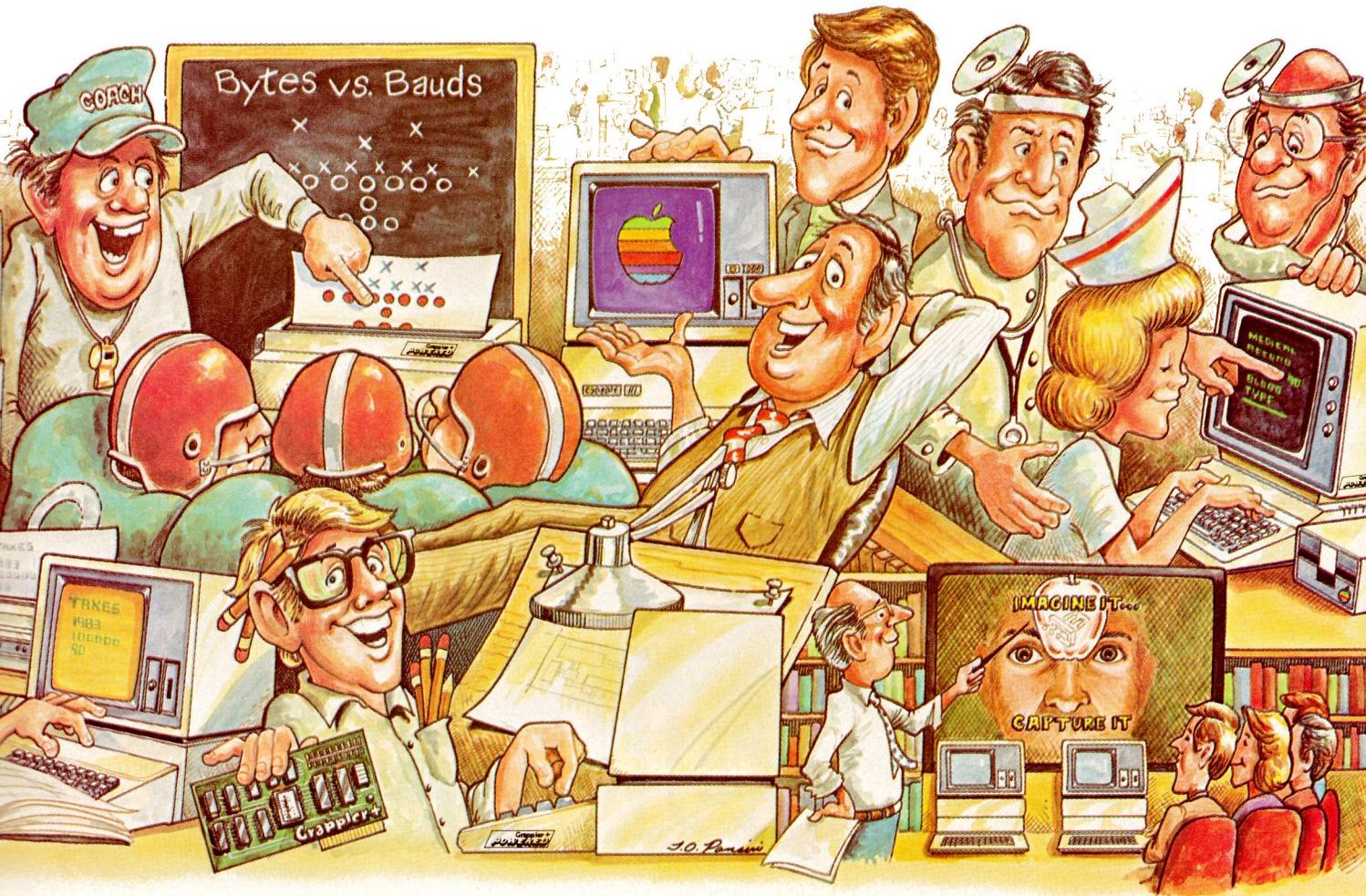
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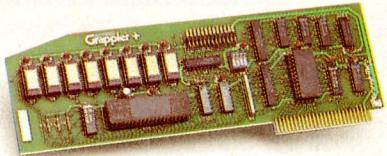
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by Bill O'Brien

On Being Continued

Listing 1. MARQUEE.000 character definitions for the Apple III.

```

1000 GOTO 1025
1005 UNLOCK "MARQUEE.000"
1010 SAVE "MARQUEE.000"
1015 LOCK "MARQUEE.000"
1020 END
1025 DIM ALPH$ (100,8) : HOME: VPOS=12: PRINT "LOADING CHARACTER
PARAMETERS"
1030 BLANK$=CHR$ (23)+CHR$ (255)
1035 REM DEFINE THE CHARACTERS
1040 REM "A"
1045 ALPH$ (65,1)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)
)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)
)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)+CHR$ (17)
1050 ALPH$ (65,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
)+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (17)
1055 ALPH$ (65,3)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
)+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (17)
1060 ALPH$ (65,4)=ALPH$ (65,3)
1065 ALPH$ (65,5)=ALPH$ (65,2)
1070 ALPH$ (65,6)=ALPH$ (65,1)
1075 ALPH$ (65,7)=BLANK$
1080 REM "B"
1085 ALPH$ (66,1)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
)+CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)
1090 ALPH$ (66,1)=ALPH$ (66,1)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)+CHR$ (17)
1095 ALPH$ (66,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)+CHR$ (17)
1100 ALPH$ (66,3)=ALPH$ (66,2)
1105 ALPH$ (66,4)=ALPH$ (66,2)
1110 ALPH$ (66,5)=ALPH$ (66,2)
1115 ALPH$ (66,6)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (17)
1120 ALPH$ (66,7)=BLANK$
1125 REM "C"
1130 ALPH$ (67,1)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (17)
1135 ALPH$ (67,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)+CHR$ (17)
1140 ALPH$ (67,3)=ALPH$ (67,2)
1145 ALPH$ (67,4)=ALPH$ (67,2)
1150 ALPH$ (67,5)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)+CHR$ (17)
1155 ALPH$ (67,6)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (17)
1160 ALPH$ (67,7)=BLANK$
1165 REM "D"
1170 ALPH$ (68,1)=ALPH$ (66,1)
1175 ALPH$ (68,2)=ALPH$ (67,2)
1180 ALPH$ (68,3)=ALPH$ (67,2)
1185 ALPH$ (68,4)=ALPH$ (67,2)
1190 ALPH$ (68,5)=ALPH$ (67,2)
1195 ALPH$ (68,6)=ALPH$ (67,1)
1200 ALPH$ (68,7)=BLANK$
1205 REM "E"

```

Listing continued.

Last month you saw a simple program used to manipulate the Apple III screen. It painted segments of inverse blocks at various screen locations and then moved the sections, independently of each other, until they formed the word APPLE III. It was a good demonstration, but aside from that it had no practical use.

All of that led me to think, "Why not do something that makes sense?" When I had my Apple II, and, in fact, for almost all of the computers I've used, there was a scrolling message program. The only computer I hadn't seen it for was, of course, the Apple III.

That shouldn't be a problem. You've already seen how to scroll characters from side to side and from top to bottom using Basic. Once the impediment of using machine language (as do many versions of the billboard or marquee type program) has been dispensed with, there should be few obstacles. Since I'm an impatient kind of guy, I didn't want to wait for one of my erstwhile readers to write it. Such was the noble birth of MARQUEE III.

Actually, the program consists of two separate sections, MARQUEE.000 (Listing 1) and MARQUEE.001 (Listing 2). We'll only cover them briefly since I discussed the concepts behind the functions last month.

MARQUEE.000 contains the definition sections for all of the supported characters. Please note that not all of the ASCII character set is used. Only the uppercase alphabet, numerals and a few of the symbols that aid in communication of ideas were defined. This is done by creating a matrix,

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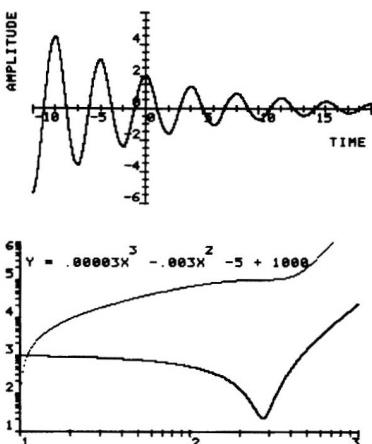
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Listing continued.

```

1210  ALPH$ (69,1)=ALPH$ (66,1)
1215  ALPH$ (69,2)=ALPH$ (66,2)
1220  ALPH$ (69,3)=ALPH$ (66,2)
1225  ALPH$ (69,4)=ALPH$ (66,2)
1230  ALPH$ (69,5)=ALPH$ (66,2)
1235  ALPH$ (69,6)=ALPH$ (67,2)
1240  ALPH$ (69,7)=BLANK$
1245  REM "F"
1250  ALPH$ (70,1)=ALPH$ (66,1)
1255  ALPH$ (70,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
     )+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (17)
1260  ALPH$ (70,3)=ALPH$ (70,2)
1265  ALPH$ (70,4)=ALPH$ (70,2)
1270  ALPH$ (70,5)=ALPH$ (70,2)
1275  ALPH$ (70,6)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
     )+CHR$ (17)
1280  ALPH$ (70,7)=BLANK$
1285  REM "G"
1290  ALPH$ (71,1)=ALPH$ (67,1)
1295  ALPH$ (71,2)=ALPH$ (67,2)
1300  ALPH$ (71,3)=ALPH$ (67,2)
1305  ALPH$ (71,4)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
     )+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)
     )+CHR$ (13)+CHR$ (32)+CHR$ (17)
1310  ALPH$ (71,5)=ALPH$ (71,4)
1315  ALPH$ (71,6)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
     )+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)
     )+CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)
     )+CHR$ (17)
1320  ALPH$ (71,7)=BLANK$
1325  REM "H"
1330  ALPH$ (72,1)=ALPH$ (66,1)
1335  ALPH$ (72,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)
     )+CHR$ (17)
1340  ALPH$ (72,3)=ALPH$ (72,2)
1345  ALPH$ (72,4)=ALPH$ (72,2)
1350  ALPH$ (72,5)=ALPH$ (72,2)
1355  ALPH$ (72,6)=ALPH$ (66,1)
1360  ALPH$ (72,7)=BLANK$
1365  REM "I"
1370  ALPH$ (73,1)=ALPH$ (67,2)
1375  ALPH$ (73,2)=ALPH$ (67,2)
1380  ALPH$ (73,3)=ALPH$ (66,1)
1385  ALPH$ (73,4)=ALPH$ (67,2)
1390  ALPH$ (73,5)=ALPH$ (67,2)
1395  ALPH$ (73,6)=""
1400  ALPH$ (73,7)=BLANK$
1405  REM "J"
1410  ALPH$ (74,1)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)
     )+CHR$ (17)
1415  ALPH$ (74,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)
     )+CHR$ (17)
1420  ALPH$ (74,3)=ALPH$ (74,2)
1425  ALPH$ (74,4)=ALPH$ (74,2)
1430  ALPH$ (74,5)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
     )+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
     +CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)
     +CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (17)
1435  ALPH$ (74,6)=""
1440  ALPH$ (74,7)=BLANK$
1445  REM "K"
1450  ALPH$ (75,1)=ALPH$ (66,1)
1455  ALPH$ (75,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)
     )+CHR$ (17)
1460  ALPH$ (75,3)=ALPH$ (75,2)
1465  ALPH$ (75,4)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)
     )+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (17)
1470  ALPH$ (75,5)=ALPH$ (67,6)
1475  ALPH$ (75,6)=ALPH$ (67,2)
1480  ALPH$ (75,7)=BLANK$
1485  REM "L"
1490  ALPH$ (76,1)=ALPH$ (66,1)
1495  ALPH$ (76,2)=ALPH$ (74,2)
1500  ALPH$ (76,3)=ALPH$ (74,2)
1505  ALPH$ (76,4)=ALPH$ (74,2)
1510  ALPH$ (76,5)=ALPH$ (74,2)
1515  ALPH$ (76,6)=ALPH$ (74,2)
1520  ALPH$ (76,7)=BLANK$
1525  REM "M"
1530  ALPH$ (77,1)=ALPH$ (66,1)
1535  ALPH$ (77,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
     )+CHR$ (17)
1540  ALPH$ (77,3)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)
     )+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
     )+CHR$ (11)+CHR$ (32)+CHR$ (17)

```

Listing continued

A name to remember for memory in a hurry.

flashcard^{T.M.}

disk emulator for Apple® computers

ALPH\$, whose elements are the control code for inverse on (CHR\$(18)), the cursor positioning codes, the space character, and the control code for inverse off (CHR\$(17)).

To print a character in the "message," the ASCII code for each of the characters is determined. The elements of ALPH\$ that coincide with those numbers are selected and the printing process begins. (For example, suppose an A were the character to be printed. Its ASCII value is 65, so the array beginning with ALPH\$(65,x) would be printed.) In all cases, the start position for printing is screen column 79 and screen row 7 (since the direction of the scroll is left to right).

One thing you might immediately notice about MARQUEE.000 is that it's incredibly long. A shortcut to defining the characters could be taken by creating the matrix as integer values and using a separate GOSUB command to send the action down to a line that sets and prints at the cursor position. However, doing things that way would not have illustrated the ability to incorporate cursor positioning within a defined variable. That's perhaps the most important message in the entire program. I took steps, though, to minimize the amount of memory used. Rather than leave MARQUEE.000 resident in memory, MARQUEE.001 is CHAINED in, relieving the Apple III memory of the bytes taken up by the physical code. Only the variable space used by the matrix occupies space.

MARQUEE.001 itself is straightforward. It lets you enter your message and then it analyzes the variable, determining which characters should be displayed.

Trial by Fire

MARQUEE III, like a few other programs presented in III's Company, might pose a problem for some of you. As mentioned, it's rather long. For some reason, there are those of you out there who claim not to have the time to sit down, enter the programs and correct whatever typos might have slipped by in the process. Seeing how I work a regular 9-5 job,



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Listing continued.

```

1545 ALPHS(77,4)=ALPHS(77,3)
1550 ALPHS(77,5)=ALPHS(77,2)
1555 ALPHS(77,6)=ALPHS(66,1)
1560 ALPHS(77,7)=BLANK$
1565 REM "N"
1570 ALPHS(78,1)=ALPHS(66,1)
1575 ALPHS(78,2)=ALPHS(77,2)
1580 ALPHS(78,3)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32)
    )+CHR$(17)
1585 ALPHS(78,4)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(10)+CHR$(3
    2)+CHR$(26)+CHR$(79)+CHR$(11)+CHR$(32)+CHR$(17)
1590 ALPHS(78,5)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(12)+CHR$(3
    2)+CHR$(17)
1595 ALPHS(78,6)=ALPHS(66,1)
1600 ALPHS(78,7)=BLANK$
1605 REM "O"
1610 ALPHS(79,1)=ALPHS(67,1)
1615 ALPHS(79,2)=ALPHS(67,2)
1620 ALPHS(79,3)=ALPHS(67,2)
1625 ALPHS(79,4)=ALPHS(67,2)
1630 ALPHS(79,5)=ALPHS(67,2)
1635 ALPHS(79,6)=ALPHS(67,1)
1640 ALPHS(79,7)=BLANK$
1645 REM "P"
1650 ALPHS(80,1)=ALPHS(70,1)
1655 ALPHS(80,2)=ALPHS(70,2)
1660 ALPHS(80,3)=ALPHS(70,3)
1665 ALPHS(80,4)=ALPHS(70,4)
1670 ALPHS(80,5)=ALPHS(70,5)
1675 ALPHS(80,6)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32)
    )+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32)+CHR$(17)
1680 ALPHS(80,7)=BLANK$
1685 REM "Q"
1690 ALPHS(81,1)=ALPHS(67,1)
1695 ALPHS(81,2)=ALPHS(67,2)
1700 ALPHS(81,3)=ALPHS(67,2)
1705 ALPHS(81,4)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(7)+CHR$(32)
    )+CHR$(26)+CHR$(79)+CHR$(12)+CHR$(32)+CHR$(26)+CHR$(79)
    )+CHR$(13)+CHR$(32)+CHR$(17)
1710 ALPHS(81,5)=ALPHS(67,2)
1715 ALPHS(81,6)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32)
    )+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32)+CHR$(26)+CHR$(79)
    +CHR$(10)+CHR$(32)+CHR$(26)+CHR$(79)+CHR$(11)+CHR$(32)
    +CHR$(26)+CHR$(79)+CHR$(12)+CHR$(32)+CHR$(26)+CHR$(79)
    +CHR$(14)+CHR$(32)+CHR$(17)
1720 ALPHS(81,7)=BLANK$
1725 REM "R"
1730 ALPHS(82,1)=ALPHS(66,1)
1735 ALPHS(82,2)=ALPHS(70,2)
1740 ALPHS(82,3)=ALPHS(70,2)
1745 ALPHS(82,4)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(7)+CHR$(32)
    )+CHR$(26)+CHR$(79)+CHR$(10)+CHR$(32)+CHR$(26)+CHR$(79)
    )+CHR$(11)+CHR$(32)+CHR$(17)
1750 ALPHS(82,5)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(7)+CHR$(32)
    )+CHR$(26)+CHR$(79)+CHR$(10)+CHR$(32)+CHR$(26)+CHR$(79)
    )+CHR$(12)+CHR$(32)+CHR$(17)
1755 ALPHS(82,6)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32)
    )+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32)+CHR$(26)+CHR$(79)
    +CHR$(13)+CHR$(32)+CHR$(17)
1760 ALPHS(82,7)=BLANK$
1765 REM "S"
1770 ALPHS(83,1)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32)
    )+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32)+CHR$(26)+CHR$(79)
    +CHR$(12)+CHR$(32)+CHR$(17)
1775 ALPHS(83,2)=ALPHS(69,2)
1780 ALPHS(83,3)=ALPHS(69,2)
1785 ALPHS(83,4)=ALPHS(69,2)
1790 ALPHS(83,5)=ALPHS(69,2)
1795 ALPHS(83,6)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32)
    )+CHR$(26)+CHR$(79)+CHR$(11)+CHR$(32)+CHR$(26)+CHR$(79)
    )+CHR$(12)+CHR$(32)+CHR$(17)
1800 ALPHS(83,7)=BLANK$
1805 REM "T"
1810 ALPHS(84,1)=ALPHS(70,6)
1815 ALPHS(84,2)=ALPHS(70,6)
1820 ALPHS(84,3)=ALPHS(66,1)
1825 ALPHS(84,4)=ALPHS(70,6)
1830 ALPHS(84,5)=ALPHS(70,6)
1835 ALPHS(84,6)=""
1840 ALPHS(84,7)=BLANK$
1845 REM "U"
1850 ALPHS(85,1)=ALPHS(74,5)
1855 ALPHS(85,2)=ALPHS(74,2)
1860 ALPHS(85,3)=ALPHS(74,2)
1865 ALPHS(85,4)=ALPHS(74,2)

```

Listing continued.

I can empathize with this problem. Read carefully—perhaps there is a solution.

If you take two 6×9 inch envelopes and address one to me and one to yourself, that's a start. Put postage on both. Fold the one addressed to yourself and put it in the envelope addressed to me. Now take one blank diskette and two pieces of stiff cardboard (or a disk mailer) and put those in the envelope also. Last, and probably not least, take a dollar (\$1.00) in cash, check or money order. This is the ubiquitous handling charges we have all become familiar with

**"If it works
out this month,
it will be
continued."**

throughout the years. Seal the envelope addressed to me (with all of the above inside) and mark it "Attention: Marquee III." Mail it to me. Sometime in the not too distant future, you will receive back a copy of MARQUEE III. Now for the problems.

The only program available is MARQUEE III. Also, if you forget any of the essential ingredients, all you'll get is your envelope back (unless, of course, you've forgotten the self addressed and stamped envelope), which means the potential for dissatisfaction is quite great. If it works out this month, it will be continued (and perhaps extended into the past). If it doesn't, then strike another blow for time consuming activities.

March Hare

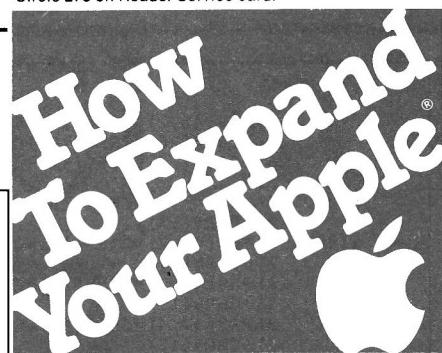
As it does for our friend, the late Mr. Rabbit, time plays an important part in all our lives. The Apple III contains two reserved variables that can assist us keeping track of time.

Listing continued.

```

1870 ALPH$ (85,5) =ALPH$ (74,2)
1875 ALPH$ (85,6) =ALPH$ (74,5)
1880 ALPH$ (85,7) =BLANK$
1885 REM "V"
1890 ALPH$ (86,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+
    CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (17)
1895 ALPH$ (86,2) =ALPH$ (74,1)
1900 ALPH$ (86,3) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (3
    2)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)+CHR$ (17)
1905 ALPH$ (86,4) =ALPH$ (86,3)
1910 ALPH$ (86,5) =ALPH$ (74,1)
1915 ALPH$ (86,6) =ALPH$ (86,1)
1920 ALPH$ (86,7) =BLANK$
1925 REM "W"
1930 ALPH$ (87,1) =ALPH$ (66,1)
1935 ALPH$ (87,2) =ALPH$ (74,1)
1940 ALPH$ (87,3) =ALPH$ (77,3)
1945 ALPH$ (87,4) =ALPH$ (77,3)
1950 ALPH$ (87,5) =ALPH$ (74,1)
1955 ALPH$ (87,6) =ALPH$ (66,1)
1960 ALPH$ (87,7) =BLANK$
1965 REM "X"
1970 ALPH$ (88,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)
    +CHR$ (17)
1975 ALPH$ (88,2) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (17)
1980 ALPH$ (88,3) =ALPH$ (75,2)
1985 ALPH$ (88,4) =ALPH$ (75,2)
1990 ALPH$ (88,5) =ALPH$ (88,2)
1995 ALPH$ (88,6) =ALPH$ (88,1)
2000 ALPH$ (88,7) =BLANK$
2005 REM "Y"
2010 ALPH$ (89,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (9)+CHR$ (32)+CHR$ (17)
2015 ALPH$ (89,2) =ALPH$ (75,2)
2020 ALPH$ (89,3) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (3
    2)+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (7
    9)+CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (3
    2)+CHR$ (17)
2025 ALPH$ (89,4) =ALPH$ (75,2)
2030 ALPH$ (89,5) =ALPH$ (89,1)
2035 ALPH$ (89,6) ="
2040 ALPH$ (89,7) =BLANK$
2045 REM "Z"
2050 ALPH$ (90,1) =ALPH$ (73,1)
2055 ALPH$ (90,2) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2060 ALPH$ (90,3) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2065 ALPH$ (90,4) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2070 ALPH$ (90,5) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2075 ALPH$ (90,6) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2080 ALPH$ (90,7) =BLANK$
2085 REM "
2090 ALPH$ (32,1) ="
2095 ALPH$ (32,2) ="
2100 ALPH$ (32,3) ="
2105 ALPH$ (32,4) ="
2110 ALPH$ (32,5) ="
2115 ALPH$ (32,6) ="
2120 ALPH$ (32,7) ="
2125 REM "."
2130 ALPH$ (46,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (3
    2)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)+CHR$ (17)
2135 ALPH$ (46,2) =ALPH$ (46,1)
2140 ALPH$ (46,3) ="
2145 ALPH$ (46,4) ="
2150 ALPH$ (46,5) ="
2155 ALPH$ (46,6) ="
2160 ALPH$ (46,7) ="
2165 REM "."
2170 ALPH$ (44,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (3
    2)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)+CHR$ (17)

```

Listing continued.

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Listing continued.

```

2175  ALPH$ (44,2)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(12)+CHR$(3
2) +CHR$(26)+CHR$(79)+CHR$(13)+CHR$(32)+CHR$(26)+CHR$(7
9)+CHR$(14)+CHR$(32)+CHR$(17)
2180  REM "/"
2185  ALPH$ (47,1)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(13)+CHR$(3
2) +CHR$(17)
2190  ALPH$ (47,2)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(12)+CHR$(3
2) +CHR$(17)
2195  ALPH$ (47,3)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(11)+CHR$(3
2) +CHR$(17)
2200  ALPH$ (47,4)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(10)+CHR$(3
2) +CHR$(17)
2205  ALPH$ (47,5)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32
)+CHR$(17)
2210  ALPH$ (47,6)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32
)+CHR$(17)
2215  ALPH$ (47,7)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(7)+CHR$(32
)+CHR$(17)
2220  REM "("
2225  ALPH$ (40,1)=ALPH$(77,3)
2230  ALPH$ (40,2)=ALPH$(67,6)
2235  ALPH$ (40,3)=ALPH$(73,1)
2240  ALPH$ (40,4)=ALPH$(73,1)
2245  REM ")"
2250  ALPH$ (41,1)=ALPH$(73,1)
2255  ALPH$ (41,2)=ALPH$(73,1)
2260  ALPH$ (41,3)=ALPH$(67,6)
2265  ALPH$ (41,4)=ALPH$(77,3)
2270  REM "-"
2275  ALPH$ (45,1)=ALPH$(72,2)
2280  ALPH$ (45,2)=ALPH$(72,2)
2285  ALPH$ (45,3)=ALPH$(72,2)
2290  ALPH$ (45,4)=ALPH$(72,2)
2295  ALPH$ (45,5)=ALPH$(72,2)
2300  REM ":" ;
2305  ALPH$ (58,1)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(11)+CHR$(32)+CHR$(26)+CHR$(79)+CHR$(12)+CHR$(32
)+CHR$(17)
2310  ALPH$ (58,2)=ALPH$(58,1)
2315  REM ";"
2320  ALPH$ (59,1)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(14)+CHR$(3
2) +CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(9)+CHR$(32)+CHR$(26)+CHR$(79)+CHR$(11)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(12)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(13)+CHR$(32)+CHR$(17)
2325  ALPH$ (59,2)=ALPH$(58,1)
2330  REM "1"
2335  ALPH$ (49,1)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(13)+CHR$(32)+CHR$(17)
2340  ALPH$ (49,2)=ALPH$(69,6)
2345  ALPH$ (49,3)=ALPH$(66,1)
2350  ALPH$ (49,4)=ALPH$(74,2)
2355  ALPH$ (49,5)=ALPH$(74,2)
2360  REM "2"
2365  ALPH$ (50,1)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(12)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(13)+CHR$(32)+CHR$(17)
2370  ALPH$ (50,2)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(7)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(11)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(12)+CHR$(32)+CHR$(26)+CHR$(79)+CHR$(13)+CHR$(32
)+CHR$(17)
2375  ALPH$ (50,3)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(7)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(10)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(11)+CHR$(32)+CHR$(26)+CHR$(79)+CHR$(13)+CHR$(32
)+CHR$(17)
2380  ALPH$ (50,4)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(7)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(10)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(13)+CHR$(32)+CHR$(17)
2385  ALPH$ (50,5)=ALPH$(50,4)
2390  ALPH$ (50,6)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(13)+CHR$(32)+CHR$(17)
2395  REM "3"
2400  ALPH$ (51,1)=ALPH$(67,6)
2405  ALPH$ (51,2)=ALPH$(67,2)
2410  ALPH$ (51,3)=ALPH$(66,2)
2415  ALPH$ (51,4)=ALPH$(66,2)
2420  ALPH$ (51,5)=ALPH$(66,6)
2425  REM "4"
2430  ALPH$ (52,1)=CHR$(18)+CHR$(26)+CHR$(79)+CHR$(8)+CHR$(32
)+CHR$(26)+CHR$(79)+CHR$(9)+CHR$(32)+CHR$(26)+CHR$(79
)+CHR$(10)+CHR$(32)+CHR$(17)
2435  ALPH$ (52,2)=ALPH$(72,2)
2440  ALPH$ (52,3)=ALPH$(72,2)
2445  ALPH$ (52,4)=ALPH$(72,2)

```

Listing continued.

Even if you don't have a clock chip, DATE\$ and TIME\$ can still be used to monitor static time. The hard part is setting the time correctly.

The obvious method would be to use the System Utilities disk. Obvious though it is, it's hardly convenient. Some programs, such as Applewriter III, have time/date setting ability built in. Unfortunately, most don't. From Basic, you could always run the Apple supplied program, TIMESET. If you've ever used it, you know that it can certainly disrupt a screen display. It may be cute, but it isn't something you might want to incorporate into a program. Well, most of it isn't.

At first, I was going to list out all of TIMESET. The program fills two standard sized sheets of paper. After listing it, I gave it a careful once-over. Only three lines are used to actually set the time and date parameters. The rest are error, screen and keyboard input traps.

DATE\$ stores the date in a yy/mm/dd format where yy is the last two digits of the current year, mm the month and dd the date. Similarly, TIME\$ displays hh:mm:ss (hours-minutes-seconds). In order to set the two variables, you'll need sufficient programming to get them. That's actually the hardest part. Once set, all that remains is to invoke the Apple supplied TIMESET.INV module and follow the program lines shown in Listing 3. They also may look somewhat involved, but the reasoning behind them is simple. Once the values for the components of the time and date are found, lines 1030 through 1090 calculate the day of the week (that routine is part of the original TIMESET program). The values needed to perform the function are determined in lines 10140 through 10230. Next, the intervention of TIMESET.INV is requested by the PERFORM statement and the values are set. The INVOKE at the end of the procedure clears the TIMESET.INV module from memory.

That's all there is to it. The only special instructions are to make certain that the invokable module is on the disk when you INVOKE it. Other than that

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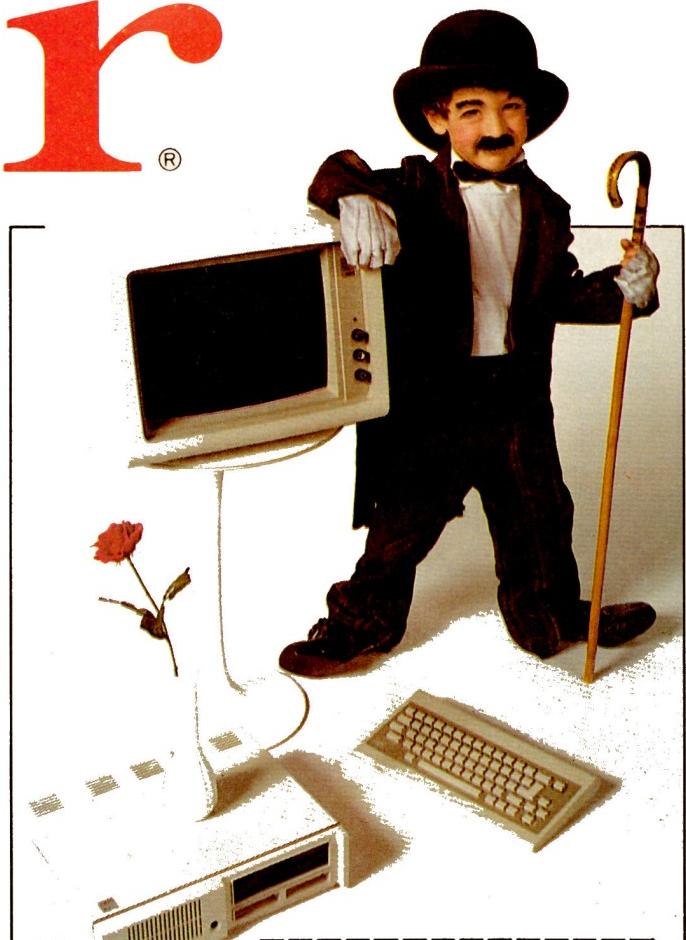
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Listing continued.

```

2450 ALPH$ (52,5) =ALPH$ (66,1)
2455 REM "5"
2460 ALPH$ (53,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+
    CHR$ (17)
2465 ALPH$ (53,2) =ALPH$ (69,2)
2470 ALPH$ (53,3) =ALPH$ (69,2)
2475 ALPH$ (53,4) =ALPH$ (69,2)
2480 ALPH$ (53,5) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (12)+CHR$ (32)+CHR$ (17)
2485 REM "6"
2490 ALPH$ (54,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (12)+CHR$ (32)+CHR$ (17)
2495 ALPH$ (54,2) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2500 ALPH$ (54,3) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2505 ALPH$ (54,4) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2510 ALPH$ (54,5) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (17)
2515 REM "7"
2520 ALPH$ (55,1) =ALPH$ (84,1)
2525 ALPH$ (55,2) =ALPH$ (84,1)
2530 ALPH$ (55,3) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)
    +CHR$ (17)
2535 ALPH$ (55,4) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (17)
2540 ALPH$ (55,5) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (9)+CHR$ (32)+CHR$ (17)
2545 REM "8"
2550 ALPH$ (56,1) =ALPH$ (66,6)
2555 ALPH$ (56,2) =ALPH$ (66,2)
2560 ALPH$ (56,3) =ALPH$ (66,2)
2565 ALPH$ (56,4) =ALPH$ (66,2)
2570 ALPH$ (56,5) =ALPH$ (66,6)
2575 REM "9"
2580 ALPH$ (57,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)+CHR$ (17)
2585 ALPH$ (57,2) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2590 ALPH$ (57,3) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (12)+CHR$ (32)+CHR$ (17)
2595 ALPH$ (57,4) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (11)+CHR$ (32)+CHR$ (17)
2600 ALPH$ (57,5) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (10)+CHR$ (32)+CHR$ (17)
2605 REM "0"
2610 ALPH$ (48,1) =ALPH$ (67,1)
2615 ALPH$ (48,2) =ALPH$ (67,2)
2620 ALPH$ (48,3) =ALPH$ (67,2)
2625 ALPH$ (48,4) =ALPH$ (67,2)
2630 ALPH$ (48,5) =ALPH$ (67,1)
2635 REM "8"
2640 ALPH$ (37,1) =ALPH$ (47,1)
2645 ALPH$ (37,2) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (12)+CHR$ (32)+CHR$ (17)
2650 ALPH$ (37,3) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (11)+CHR$ (32)+CHR$ (17)
2655 ALPH$ (37,4) =ALPH$ (47,4)
2660 ALPH$ (37,5) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2665 ALPH$ (37,6) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (13)+CHR$ (32)+CHR$ (17)
2670 ALPH$ (37,7) =ALPH$ (47,7)
2675 REM " "
2680 ALPH$ (95,1) =CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (15)+CHR$ (32)
    +CHR$ (17)

```

Listing continued.

there is absolutely no mystery involved. You can set it up as a HELLO program and have automatic time and data setting whenever you boot the disk. For those with a hard disk, this will prove beneficial when backing up the information on the disk. If you use BACKUP III you can assure yourself that only the latest versions of programs and data are saved.

In the Future

I had the opportunity to attend a press conference in New York given by Apple at the Harley Hotel (posh, very posh). They distributed copies of a new software catalogue for the III called *Will Somebody Please Tell Me What The Apple III Can Do*. By now you should have seen a copy. If not, ask for one at your local dealer.

More than that, though, it was an event at which Apple previewed some new software for the Apple III. To mention one of the two, I saw a program called Habadex distributed by Haba Systems. Briefly, it is a memory management that will permit foreground and background tasking of the additional programs it supports. Part of the system is a phone management tool that allows tracking of phone times for accounting and billing purposes. Included is a hard disk file management tool similar to Quark's (but claimed easier to use), that permits programs like AppleWriter III, Visicalc and other proprietary programs to be transferred to the hard disk and run from it.

A brief aside might be wise at this point. For those of you who haven't yet surmised the fact, most of the proprietary programming for the III and all of the applications programs that run from 6502 machine code are contained in the SOS.INTERP file. A program like Habadex transfers the INTERP file into a disk environment from which it can be executed.

Back at Habadex, believe it or not, that isn't the most desirable of its features. Part of the system is a program called Three Easy Pieces. The name is apt for more than the most obvious reason. It's a collection of three programs, a spreadsheet, database and

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word processor, that allows complete cut and paste routines interchangeably among themselves. If that sounds Lisa-ish, you're correct. Needless to say, I am prostrating myself at the doorway of Haba Systems and will hopefully have a review of it for you in the near future.

Old News

Right about now, Apple is showing the Apple III+ at COMDEX. I've tried, to the dilemma of the editors, to delay sending in this column until the press kit arrives, but alas, I'm now overdue and the mail is still remiss. Since I refuse to rumormonger about twice the graphics ability and support for 512K memory and the possibility of a 68000 add-on board, I won't say anything.

Since I do read other magazines, I happened across a column by Sol Libes. Those of you who read only the finer computer magazines may not know of him. Currently he is writing an extension of his gossip column for an electronics magazine trying to attach itself to the computer market. Mr. Libes took the liberty of predicting that Apple will continue its marketing strategy with Lisa, the IIe and Macintosh and *will drop the Apple III*. Apple, of course, is disguising this fact by introducing a new version of the III, more software, and establishing an Apple III product group to assist in the marketing of the machine. Clever these Californians—to devise such a complicated scheme to hide their true motives is fiendishly devious.

Mr. Libes also thought it was appropriate to mention that Apple was being replaced at Computerland stores by IBM because Apple tried to negotiate a better contract and it fell through. That's a half-truth and in typical poor form.

The reality of the situation (I was the manager of Computerland New York City at the time) was that Apple was trying to limit the proximity of Apple dealers to each other to preserve a reasonable market share for each one. While they could approve or disapprove of any potential dealer

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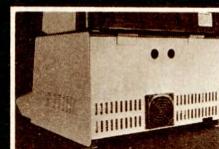


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Listing continued.

```

2685  ALPH$ (95,2)=ALPH$ (95,1)
2690  ALPH$ (95,3)=ALPH$ (95,1)
2695  ALPH$ (95,4)=ALPH$ (95,1)
2700  ALPH$ (95,5)=ALPH$ (95,1)
2705  ALPH$ (95,6)=ALPH$ (95,1)
2710  ALPH$ (95,7)=ALPH$ (95,1)
2715  REM ""
2720  ALPH$ (36,1)=ALPH$ (83,1)
2725  ALPH$ (36,2)=ALPH$ (83,2)
2730  ALPH$ (36,3)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (6)+CHR$ (32)
    )+CHR$ (17)+ALPH$ (83,2)+CHR$ (26)+CHR$ (79)+CHR$ (14)+CHR$ 
    (32)+CHR$ (17)
2735  ALPH$ (36,4)=ALPH$ (83,2)
2740  ALPH$ (36,5)=ALPH$ (83,6)
2745  REM "?"
2750  ALPH$ (33,1)=""
2755  ALPH$ (33,2)=""
2760  ALPH$ (33,3)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    )+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+
    CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)+
    CHR$ (13)+CHR$ (32)+CHR$ (17)
2765  REM "="
2770  ALPH$ (61,1)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)
    )+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)+CHR$ (17)
2775  ALPH$ (61,2)=ALPH$ (61,1)
2780  ALPH$ (61,3)=ALPH$ (61,1)
2785  ALPH$ (61,4)=ALPH$ (61,1)
2790  ALPH$ (61,5)=ALPH$ (61,1)
2795  REM "+"
2800  ALPH$ (43,1)=ALPH$ (72,2)
2805  ALPH$ (43,2)=ALPH$ (72,2)
2810  ALPH$ (43,3)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
    )+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (11)+CHR$ (32)
    +CHR$ (26)+CHR$ (79)+CHR$ (12)+CHR$ (32)+CHR$ (17)
2815  ALPH$ (43,4)=ALPH$ (72,2)
2820  ALPH$ (43,5)=ALPH$ (72,2)
2825  REM "?"
2830  ALPH$ (63,1)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
    )+CHR$ (17)
2835  ALPH$ (63,2)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    )+CHR$ (17)
2845  ALPH$ (63,3)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    )+CHR$ (26)+CHR$ (79)+CHR$ (10)+CHR$ (32)+CHR$ (26)+CHR$ (79)
    +CHR$ (11)+CHR$ (32)+CHR$ (26)+CHR$ (79)+CHR$ (13)+CHR$ (32)
    )+CHR$ (17)
2850  ALPH$ (63,4)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (7)+CHR$ (32)
    )+CHR$ (26)+CHR$ (79)+CHR$ (9)+CHR$ (32)+CHR$ (17)
2855  ALPH$ (63,5)=CHR$ (18)+CHR$ (26)+CHR$ (79)+CHR$ (8)+CHR$ (32)
    )+CHR$ (17)
3000  CHAIN"MARQUEE.001"

```

coming on board direct with Apple, Computerland Corporate was the Apple dealer of record and its stores sprouted as the seeds were borne upon the wind, with no regard for existing Apple dealerships.

What Apple Computer tried to do was achieve final approval over the dealership status of new Computerland stores. Contracts would continue, as in the past, with existing locations, but new franchisees wishing to sell the Apple product line would be subject to their approval based on their proximity to existing Apple dealerships. Computerland Corporate, of course, did not approve of that and declined to continue the relationship.

It's an old story. At the time, the facts were well known. I'm sure if Mr. Libes had bothered to research

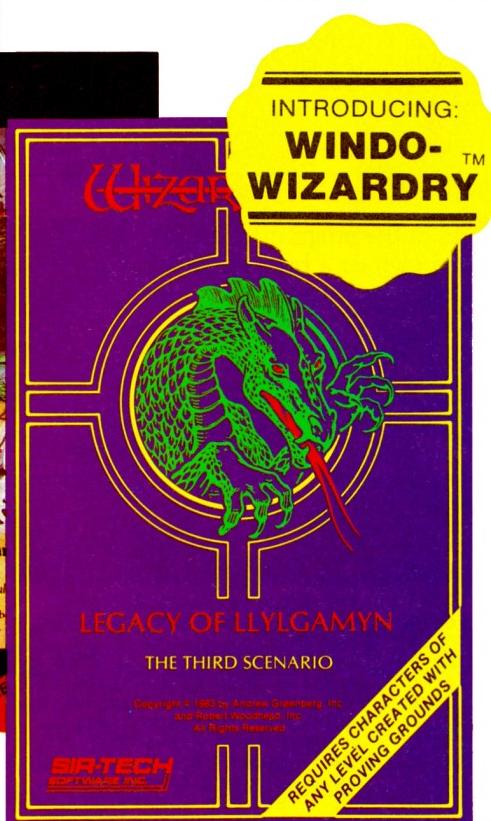
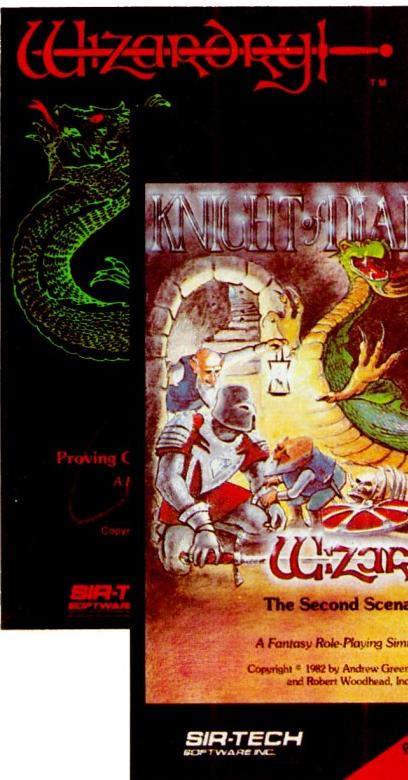
the matter he could have come up with more than connotative innuendo. Then, some people find it easier to deal with interpretation than with fact.

And in the End

So much for another month. If you've written to me and I haven't answered, please remember that you must include a Self Addressed, Stamped Envelope (SASE). If you're having a problem with some of the programs listed in here, please don't go through the trouble of getting Directory Assistance to find the number connected with the address I can be reached at. If I wanted you to call and occupy the time someone is paying me for to get work out of me, I would have included the phone number. It's not fair. Rather, print out a

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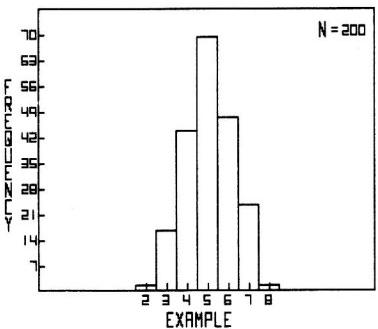
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Listing 2. MARQUEE.001 runtime module.

```

10  MESSAGE$="WELCOME TO: |MARQUEE ///|. PRESS (|ESCAPE|) T
0 BEGIN"
15  MESSAGE$="... "+MESSAGE$+"..."
20  HOME:UFLAG=0
25  ON KBD GOTO 90
30  FOR L=1 TO LEN(MESSAGE$):Y=ASC(MID$(MESSAGE$,L,1))
35  IF MID$(MESSAGE$,L,1)="|" AND UFLAG=0 THEN UFLAG=1:ELS
   E IF MID$(MESSAGE$,L,1)="|" AND UFLAG=1 THEN UFLAG=0
40  IF MID$(MESSAGE$,L,1)="|" THEN 80
44  FOR X=1 TO 7
45  IF Y=84 AND X=7 THEN 70
50  IF Y=58 AND X>4 OR Y=59 AND X>4 THEN 75
55  :
60  PRINT ALPH$(Y,X);
65  IF UFLAG=1 THEN PRINT ALPH$(95,X);
70  PRINT CHR$(23);CHR$(255);:IF UFLAG=1 AND X<>7 THEN P
      RINT ALPH$(95,X);
75  NEXT X
80  NEXT L
85  GOTO 30
90  IF KBD=27 THEN 105
95  ON KBD GOTO 90
100 RETURN
105 HOME
107 TEXT:HOME:START=1
110 INPUT"YOUR MESSAGE PLEASE: ";MESSAGE$
115 IF MESSAGE$="" THEN 110
120 IF MESSAGE$="quit" THEN 155
125 FOR X=1 TO LEN(MESSAGE$)
130   IF MID$(MESSAGE$,X,1)="|" THEN 140
135   IF ASC(MID$(MESSAGE$,X,1))>95 THEN 110
140   NEXT
145 IF LEN(MESSAGE$)>230 THEN 110
150 GOTO 15
155 HOME:END

```

listing of the program as you typed it in and include a brief explanation of the error message(s) you're getting. Mail it to me with a SASE. As time permits, I'll go over the listing and see

if I can find out what's wrong. So much for the statement of policy.

In the meantime, as the saying goes, live long and program. Ciao bene, AppleAmerica. ■

Listing 3. Setting the time and date from Basic, using your Apple III.

```

10000 REM  YEAR$ IS THE YEAR (1984, 1985, ETC.)
10005 REM  DAYS$ IS THE NUMERIC REPRESENTATION OF THE DATE
10010 REM  MONTH$ IS THE NUMERIC REPRESENTATION OF THE MONTH
10015 REM  THIS SECTION CALCULATES THE DAY OF THE WEEK AS A
      NUMBER BETWEEN 1 AND 7 AND ASSIGNS IT TO D3%
10020 INVOKE TIMESSET.INV
10030 C% =VAL(LEFT$(YEARS$,2))
10040 D% =VAL(RIGHT$(YEARS$,2))
10050 K% =VAL(DAYS$)
10060 M% =VAL(MONTH$)-2
10070 IF M%<=0 THEN M% =M%+12:D% =D%+1
10080 D3% =CONVB((CONVB(INT(26*M%-2)/10)+K%+D%+INT(D%/4)+INT(C%/4)-2*C%) MOD 7 +1)
10090 IF D3%<0 THEN D3% =0
10100 REM  HOURS IS THE HOUR IN 24 HOUR NOTATION
10110 REM  MINUTES IS MINUTES
10120 REM  SECONDS AREN'T USED SINCE THEY ARE RESET TO ZERO
      WHEN THE CLOCK IS SET
10130 REM  ALL VALUES ARE NOW ASSIGNED AND THE CLOCK IS SET
10140 H1% =VAL(LEFT$(HOURS$,1))
10150 H2% =VAL(RIGHT$(HOURS$,1))
10160 M1% =VAL(LEFT$(MINUTES$,1))
10170 M2% =VAL(RIGHT$(MINUTES$,1))
10180 Y1% =VAL(MID$(YEARS$,3,1))
10190 Y2% =VAL(MID$(YEARS$,4,1))
10200 M1% =VAL(LEFT$(MONTH$,1))
10210 M2% =VAL(RIGHT$(MONTH$,1))
10220 D1% =VAL(RIGHT$(DAY$,1))
10230 D2% =VAL(RIGHT$(DAY$,1))
10240 PERFORM TIMESSET(%Y1%*256+%Y2%,%M1%*256+%M2%,%D1%*256+%D2%,%D3%,%H1%*256+%H2%,%M1%*256+M2%)
10250 INVOKE

```

Who knows what goes on behind closed doors?



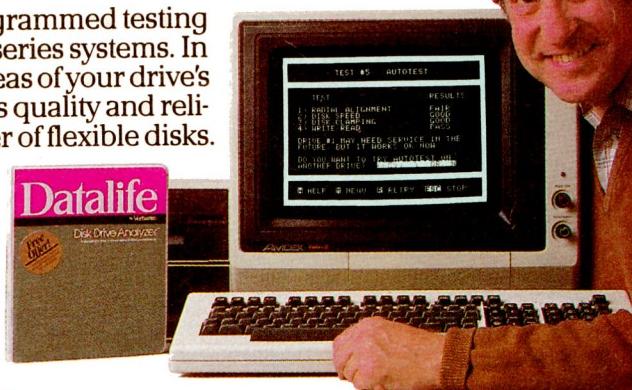
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Macintosh

The Gloves Come Off at Apple

by Bob Ryan, inCider staff

The verdict was in. Everyone from industry analysts to the national media had proclaimed IBM the winner of the personal computer sweepstakes. Heavy hitters like Digital, Wang, Texas Instruments and Data General had bowed to convention and made certain that their new machines ran MS-DOS. The problem, of course, is that the people at Apple Computer hadn't heard that the race had been decided. And so, on January 24th, they introduced Macintosh, proving once again that "it ain't over 'til it's over."

The Macintosh carries a U.S. list price of \$2495. In the following pages, I'll describe what you get for your hard-earned cash. You'll also learn about the many other new products that Apple hopes will secure its place as the world's preeminent personal computer company. But first, the Macintosh.

The System Unit

The first noticeable thing about the Macintosh is its size. The system unit has a "footprint" of 10" x 10"—unprecedented for a desktop computer. (You won't have to buy a separate desk for the Mac.) In addition, the system unit, together with the keyboard, mouse, and Macintosh Carrying Case, tips the scales at 23 lbs. The Macintosh is a truly transportable computer.

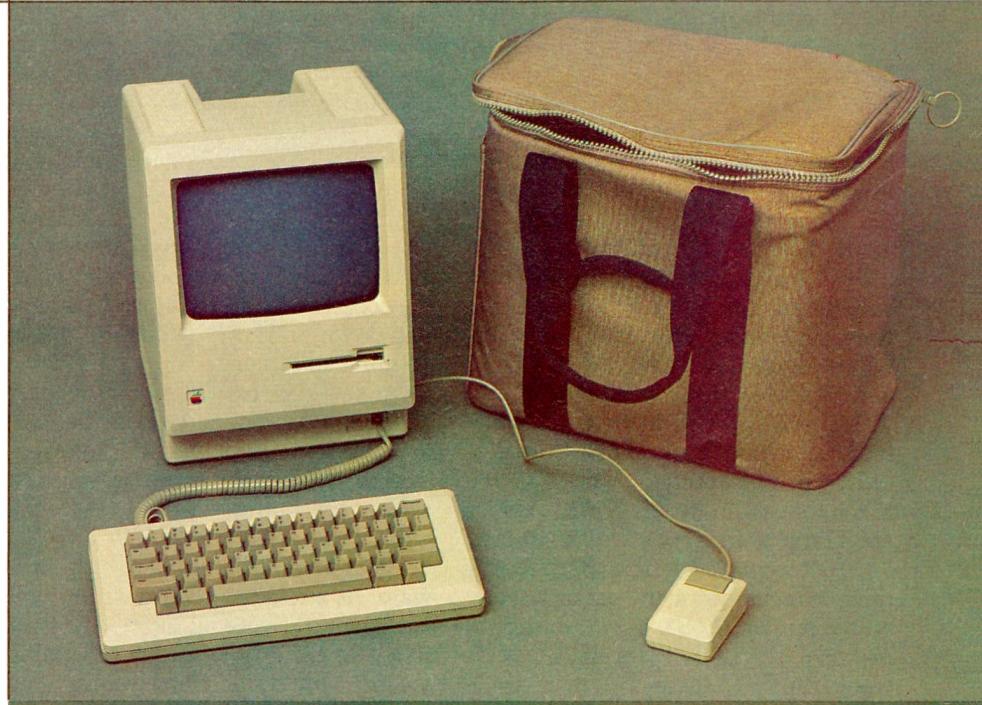
The major components of the system unit are the video display, a 400K byte, 3½-inch microfloppy disk drive, the computer's internal circuitry, and, on the back, the peripheral connectors. The video screen is a 9-inch diagonal, black and white display. The bit-mapped display has a resolution of 512 by 342 dots, resulting in sharp and clear text and graphics images. Like the Lisa, the Macintosh displays black

images on a white background. This type of display reduces eyestrain, and allows the user to see exactly what hardcopy output will look like before it goes to the printer.

The major drawback to the Macintosh display is, obviously, the lack of color capability. A color display was considered for the Macintosh, but it was deemed too expensive. The Macintosh does contain routines in ROM to drive a color printer, but unfortunately, this will be the extent of the machine's color capability for the foreseeable future.

The Macintosh is among the first computers to use the new microfloppy disk drives. Microfloppies have many advantages over their 5¼-inch cousins. They are smaller (of course) and have no exposed surfaces that can be scratched or inadvertently finger-printed. The disks are stiffer than

"I think this is our best shot at getting a computer into the hands of millions of people who wouldn't normally buy one. If this doesn't work, we don't know what else to do."—Steve Jobs



minifloppies, which means they can spin (and transfer data) faster and encode more data in a smaller area. The disk controller circuitry is an integral part of the motherboard. The controller serves both the standard internal drive and an optional external one.

Inside the Macintosh

The Macintosh is a two-board computer. The *analog* board carries the power supply and the internal speaker. The *digital* board contains the guts of the system, such as the microprocessor unit and the memory. This discussion concentrates on the components of the digital board.

The Macintosh, like the Lisa, uses the Motorola 68000 microprocessor. The 68000 is one of the most powerful microprocessors in use today. It features 32-bit architecture, an extensive instruction set, multiprocessing capa-

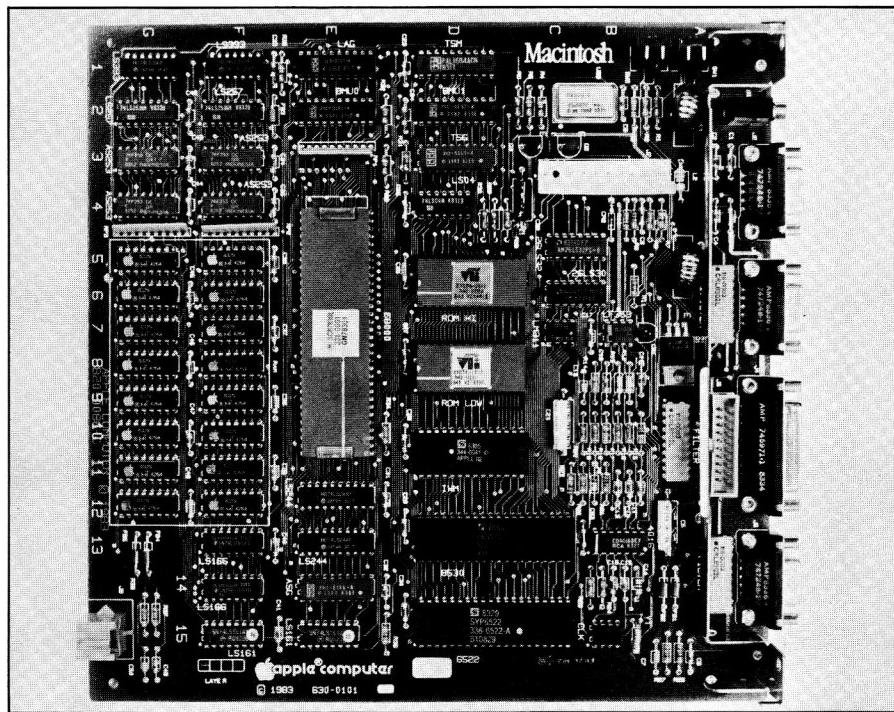


Photo 3.
The Macintosh digital board. The
64-legged monster is the MC68000.

Macintosh will be shorter (and require less memory) than comparable programs written for other machines. So, as you can see, the 128K RAM in the Macintosh will go a lot further than the same amount of memory in any other personal computer.

Window on the World

The Macintosh communicates with the outside world via five connectors located on the back of the system unit. One is used to hook up the mouse and another is connected to the internal disk controller and reserved for an external disk drive. A third connector, located on the far right of the box, is an output jack for the Mac's four-voice sound.

The last connectors are a pair of 230.4K-baud serial ports, both of which handle RS-232 and RS-422 communications. These ports are used to communicate with peripherals such as modems and printers. They also are vital in Apple's plan to interconnect their computers via the AppleBus (see sidebar).

Curiously, the Macintosh has no expansion slots. The first reason for this is that slots would have made the machine bigger, and Apple wanted to keep the Mac as small as possible. The second reason is that Apple plans to market the Lisa as its versatile, large capacity, expandable machine. They didn't want to blur the distinction between the Macintosh and the Lisa. Thus, for example, the Lisa eventually will be able to run MS-DOS. The Macintosh will never have that capability.

Minor components of the system unit include the keyboard connector slot, brightness adjustment control, and interrupt and reset switch (called the programmer's development switch). On the back you find the power switch, power plug, and a battery for the built-in clock. The battery is necessary to insure the operation of the internal clock when you lug your Macintosh around. The top of the system unit has a built-in handle.

Input Devices

The 58-key Macintosh keyboard is detached from the system unit, and is identical to the Lisa keyboard without

bilities, the ability to directly address up to 16 megabytes (million bytes) of random access memory, and enough internal registers to make any 6502 programmer think that he has died and gone to heaven. The Macintosh drives the 68000 with an 8 MHz clock (the Lisa has a 5 MHz clock). When you consider the inherent power of its microprocessor and its lightning-fast clock, you can see how the Macintosh can move a lot of bytes around in a very short time.

In addition to the 68000 and its associated chips, the Macintosh motherboard contains 128K bytes of RAM (Random Access Memory) and 64K bytes of ROM (Read Only Memory). The 128K of RAM is located in 16 64K-bit dynamic RAM chips. Although the number of memory chips inside the computer is not expandable, the Macintosh will not be limited to 128K for long. Apple expects that 256K-bit memory chips will be available in quantity by early 1985. At that time, expanding the Mac's memory will be as easy as pulling the 64K chips and replacing them with 256K chips. This procedure will increase the Macintosh's memory limit to 512K bytes.

In the meantime, however, the Macintosh is limited to 128K. This is not a large amount of memory. In fact, it is not enough to run many of the more popular software packages now on the market (Lotus 1-2-3, for example, requires 192K bytes of RAM). It would appear, therefore, that Apple has shot itself in the foot by limiting

the Macintosh, at least until next year, to 128K. Appearances, however, can be deceiving.

The Magic ROM

If the 68000 is the brain of the Macintosh, then the 64K of ROM can be considered the soul of *this* new machine. It is my impression that the folks at Apple take the most pride in the routines encoded in the Mac's ROM.

As with many machines, the Macintosh ROM contains the operating system—those programs which manage the computer's resources (file management, etc.) and allow it to communicate with peripheral devices such as disk drives and printers. The Macintosh ROM is not unique in this. What makes this ROM unique is that it also contains all the routines needed to generate the Lisa Environment (see sidebar). These include the "quickdraw" graphics routines which drive the video display, and a toolkit with all of the code needed to create and manage pull-down menus, windows, fonts, scrolling and so on.

Apple has carefully documented about 500 subroutine calls to the code in ROM and is supplying this information to third-party software vendors. These subroutines permit software writers to use Apple's code to generate the user interface for their own software. As a result, software writers will not have to devote up to 50% of their code—as they do now—to generating the user interface. Consequently, the software packages they write for the

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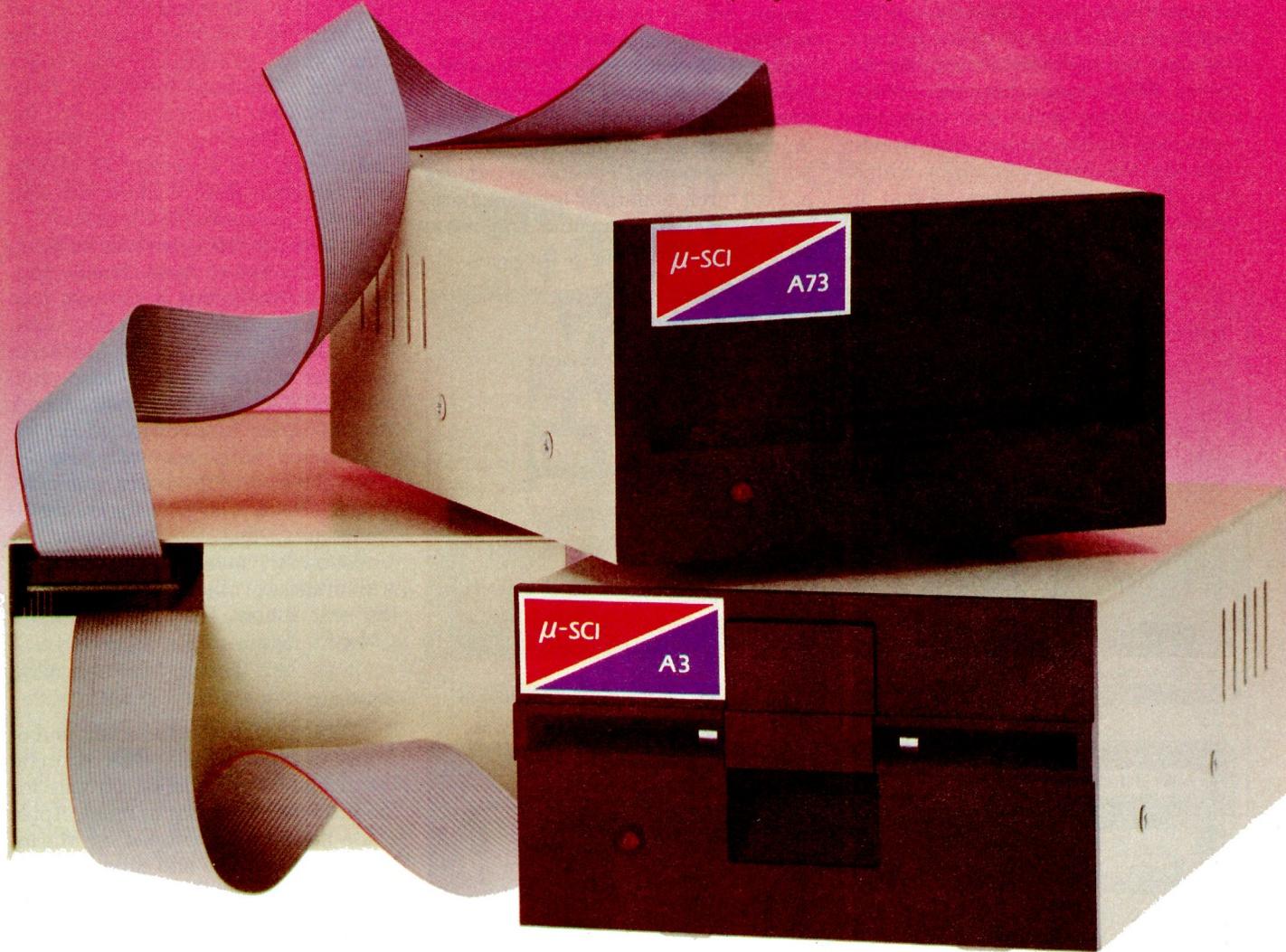
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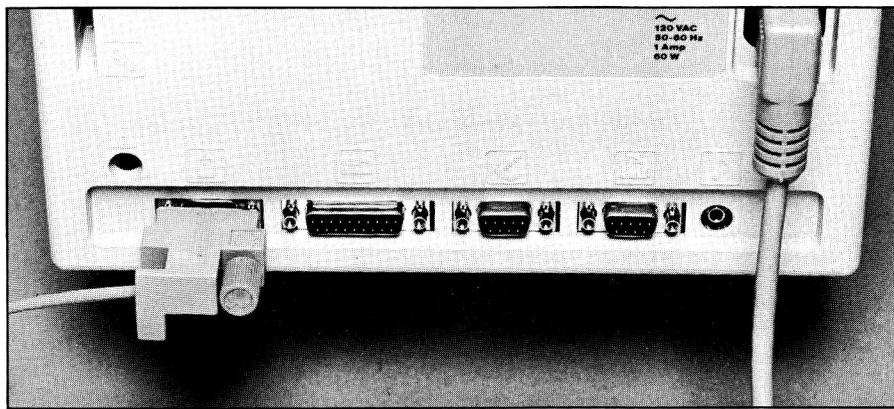


Photo 4.
Macintosh from behind. Seen from left to right are the mouse port, external drive port, two serial ports and sound connector.

a numeric keypad. The keys are laid out in standard fashion (the shift key is where it belongs) and are sculpted and tiered. With most computer companies cramming more and more keys onto their keyboards, you may wonder how the Macintosh can get by with so few. The reason, of course, is that the Macintosh has a mouse.

The mouse is a palm-sized pointing

device which provides an excellent way to move around the Lisa Environment. It controls the location of the cursor on the screen. With it you can select applications by "clicking" on the appropriate icon or make choices from pull-down menus. The mouse requires a clear area about six inches square, but this is inconsequential when you consider its usefulness.



Photo 5. The Macintosh keyboard.

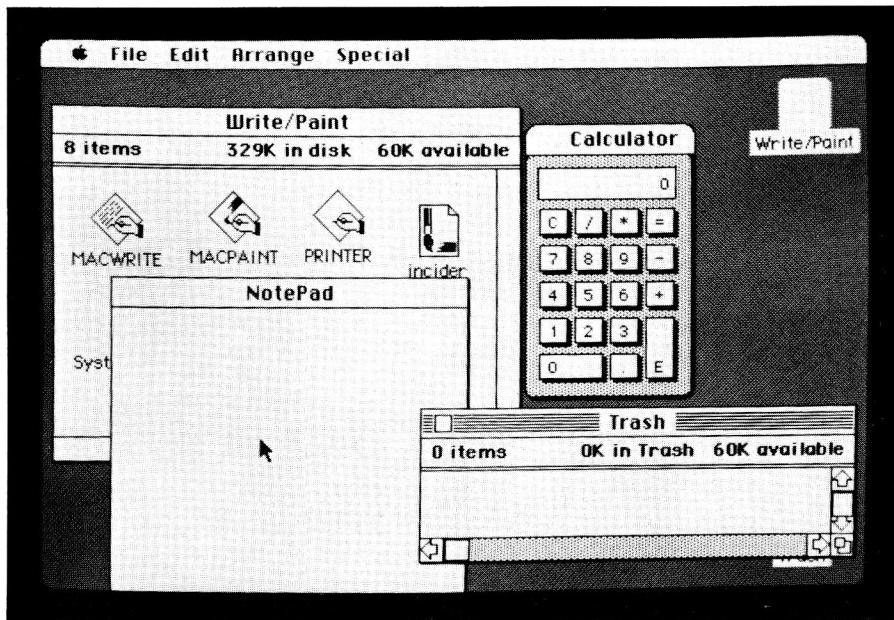


Photo 6. Multiple windows on the Macintosh Finder.

Hardware Options

The hardware I have described thus far is the standard Macintosh configuration. Apple also is offering a number of optional peripherals. The printer offered for the Macintosh is the ImageWriter serial dot matrix printer, which prints text at 120 characters per second and prints any graphics image that the Mac's screen can display. Also available are a 300-baud modem, a 1200-baud modem, a numeric keypad, the Macintosh Carrying Case, a 10-pack disk holder, and a security kit to help keep someone from walking off with your very transportable computer.

An external disk drive will be available by the first of April. Finally, Apple is also marketing a protocol converter called Appleline, which, when used in conjunction with MacTerm software, will permit the Macintosh to emulate IBM 3278 terminals. Check the accompanying chart for prices.

Optional hardware will also be available from third-party manufacturers. Tecmar and Davong are developing hard disks for the Macintosh. Undoubtedly, many other companies will introduce Macintosh products in the near future. Keep an eye on *in-Cider* for details.

Software

The success of the Macintosh, and of Apple Computer itself, depends upon the availability of quality software for the machine. With this in mind, Apple made the decision to open up Macintosh and encourage and support third-party software development.

This support is producing concrete results. By mid-December, Apple had seeded 75 software companies with machines, documentation and technical support. They expect to add many more companies to the list in the coming year. At least one company, Microsoft, has products already available. Many others have made product announcements and expect to get their software out by early summer.

By supporting third-party software development, Apple hopes to recreate the Apple II phenomenon. The One Great Truth of computer marketing is that software sells computers—and Apple wants to sell a lot of Macintosh

computers. By the fall, every major software vendor will have products out for the Macintosh, with a total of about 500 packages expected by the end of the year.

Integration's the Thing

As I noted earlier, any software writer can use the Macintosh ROM to create a user interface. In addition to the memory savings this entails, the use of a common set of routines by a number of different applications has important implications in two areas of concern to software users—integration, and ease of use.

Macintosh applications run under the Lisa Environment, so they have a lot of built-in user friendliness. Also, all applications, whether supplied by Software Publishing, Hayden Software, or Lotus Development Corporation, present very similar interfaces to the user. This consistency of interface among disparate applications will cut the time needed to learn these applications. Learning to use one application package on the Macintosh means that you've practically mastered the others.

Integration is the biggest software bonus of the Macintosh ROM. Data and graphics can be cut from one application and pasted into another—even if the two programs are supplied by different companies. For example, a table can be cut from Microsoft's Multiplan spreadsheet and pasted directly into a MacWrite document. (MacWrite is Apple's word processing software for the Macintosh.) This level of integration is unheard of on any other machine and puts the Macintosh in the forefront of the movement towards complete software integration.

One final point concerning Macintosh software. No native programming environment for the Macintosh yet exists. All Macintosh software development is currently taking place on Lisas. Apple will not have any programming languages available until the spring. (Microsoft might have a Mac version of MBasic out before then.) See the accompanying chart for a list of the software packages from Apple that are available now or that will be released in the next few months.

Conclusion

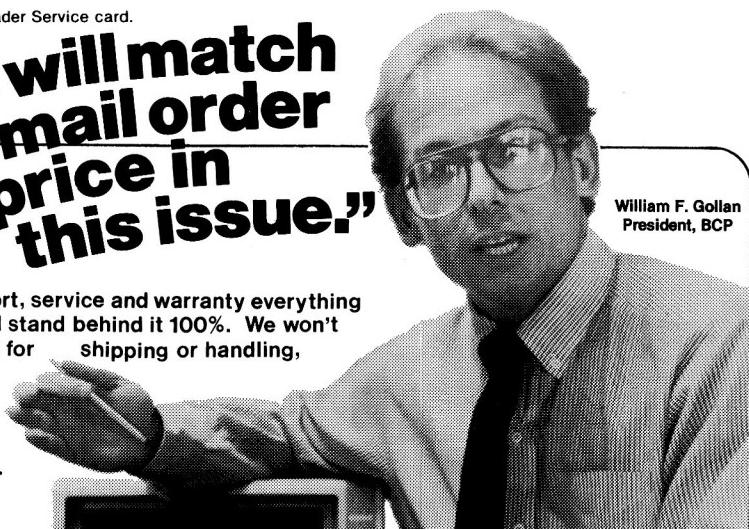
For the past year or so, people close to the personal computer industry have speculated that there may not be a place for any industry standard other than MS-DOS. Now, after Macintosh, they may well wonder if there is a place for MS-DOS.

The Macintosh is the best hardware value in the history (short though it may be) of the personal computer in-

dustry. It is a machine which will appeal to those masses of people who have neither the time nor the inclination to embark upon the long learning process required to master the intricacies of the present generation of personal computers. Barring unforeseen technical glitches and assuming that a reasonable software library is in place by the end of the year, the Macintosh should establish itself as the next standard in personal computers. ■

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300 A	\$159.95	USI		C. ITOH 1550	665.95	OkiData 83A	559.95
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Gibson Light Pen	244.95	Flashcard 144kb	279.95	Grappler +	\$135.95	8k	\$139.95
Koala Graphic Pad	94.95	Flashcard 288kb	399.95	w/16k	179.95	16k	159.95
Microsoft		Sprite I	119.95	w/32k	194.95	32k	179.95
Z80 CP/M Softcard	229.95	Sprite II	199.95	w/64k	229.95	64k	194.95
Premium Pack II+	459.95	Supersprite	309.95	PKASO/U	135.95	128k	274.94
Premium Pack IIe	339.95	Videx		SOFTWARE			
Quadram eRam	119.95	Videoterm w/lss	229.95	Bank Street Writer	\$49.95	PFS:Report	\$79.95
Titan (Saturn)		Ultraterm	279.95	Dollars & Sense	79.95	PFS:Graph	79.95
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64k Ram	264.95	Enhancer II	109.95	Home Word	39.95	Screenwriter II	84.95
128k Ram	354.95	PSIO card	179.95	Home Accountant	49.95	Typing Tutor	19.95
FLOPPY DRIVES				Multiplan DOS	179.95	Versaform	249.95
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The Lisa Environment

The Lisa Environment is Apple's name for the user interface supplied with its family of 32-bit computers. Called "windowing" by other manufacturers, the Lisa Environment uses icons, pull-down menus, windows and the mouse to create the ultimate user-friendly interface. Thus, a person using an Apple 32 machine doesn't have to learn a lot of computer specific jargon in order to employ the power of a personal computer. This ease of use makes the Macintosh and the Lisa attractive to an entirely new group of potential computerists.

The accompanying photographs demonstrate the elements of the Lisa Environment as seen in the Macintosh, from the time the machine is turned on until an application—in

this case MacPaint—is up and running. All the major elements of the Lisa Environment are depicted.

When you turn on the Macintosh, you are prompted to insert a disk. For demonstration purposes, I inserted the MacWrite/Paint disk. The result was the screen shown in Photo 7. After a few seconds, the icon for the Write/Paint disk appeared on the Finder, which is analogous to an everyday desktop. Next, using the mouse, I moved the pointer to the Write/Paint icon and clicked the button once. This process selected that icon as the one I wanted to work with. Then I moved the pointer to the File heading and held down the button. The File menu appeared and I moved the pointer to the Open option (photo 8) and chose that option

by releasing the mouse button.

The Write/Paint window appeared next. I moved the pointer to the MacPaint icon, selected it (photo 9), and opened it using the File menu again. This procedure brought up MacPaint and I was ready to "paint my masterpiece" (apologies to B. Dylan). Photo 10 is the MacPaint window itself, with the drawing option selected and my handiwork on display.

I hope you glean from this brief demonstration some idea of how to use a Macintosh. Of course, nothing can take the place of hands-on experience. I suggest that you visit an Apple dealer or a friend with a Macintosh and find out for yourself how easy computing can be. ■



Photo 7. Greetings from Macintosh.

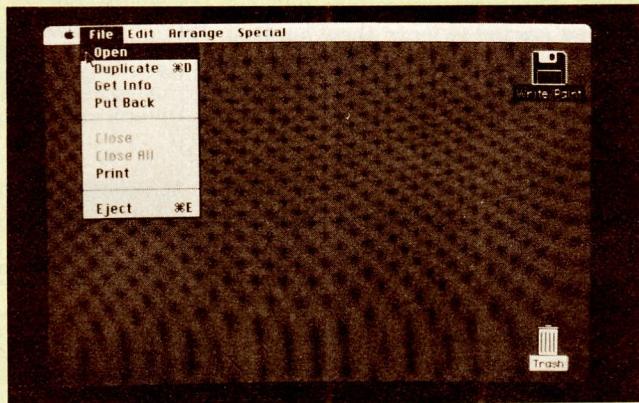


Photo 8. The Finder with Write/Paint selected and the File menu displayed.

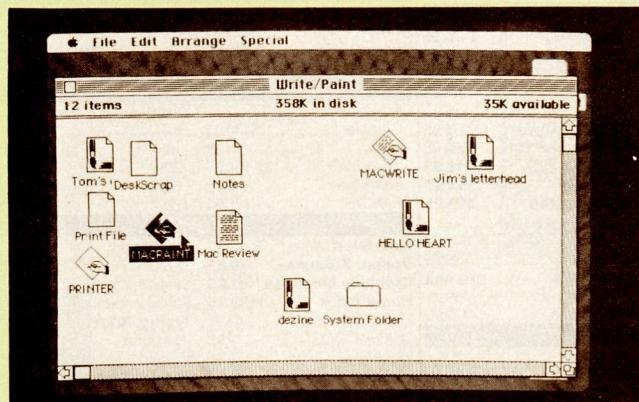


Photo 9. The Write/Paint window with MacPaint selected. Note the different icons for MacWrite and MacPaint documents.

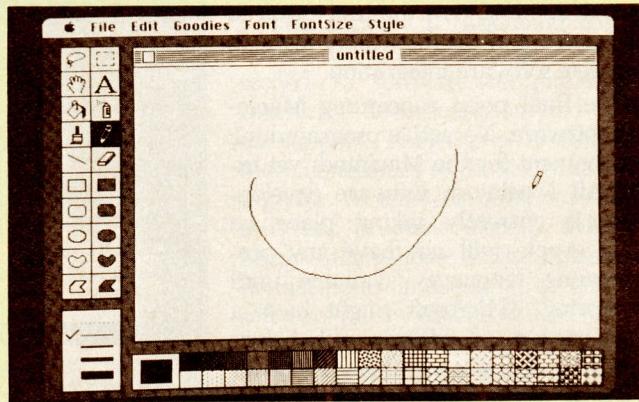


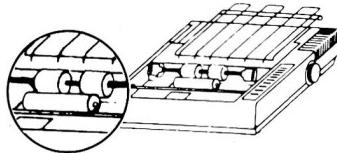
Photo 10. The MacPaint application window.

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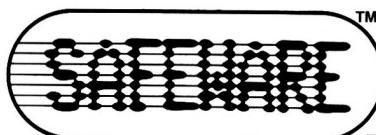
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Macintosh at a Glance

Standard Features

CPU	MC68000
clock rate	8MHz
RAM	128K
ROM	64K
operating system	proprietary (Mac Finder)
disk drives/capacity	1/400K
ports	1 mouse 1 external disk 1 sound 2 RS-232, 422 serial
expansion slots	none
video display	9 " b/w
screen resolution	512 × 342 dots
price	\$2495

Options

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AppleBus

At the COMDEX/Fall show held in Las Vegas last November, Apple Computer announced that it had dropped plans to introduce a Local Area Network called AppleNet. Instead, Apple said that it would support the IBM LAN, whenever that product is announced. Apple, however, didn't abandon plans to link its family of computers together. And so, on January 24th, it introduced AppleBus.

The AppleBus network permits Apple computers and peripherals separated by as much as 1000 feet to share data and services. Macintosh and Lisa graphics and text data can be exchanged over the AppleBus; data exchange with Apple IIs and IIIs, however, will be limited to text.

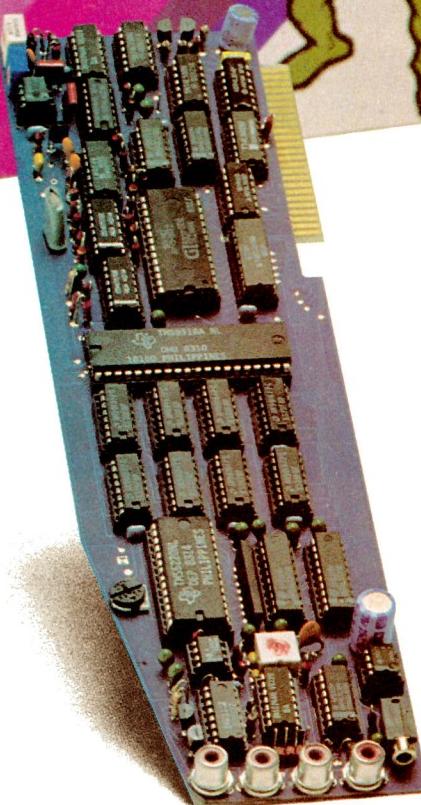
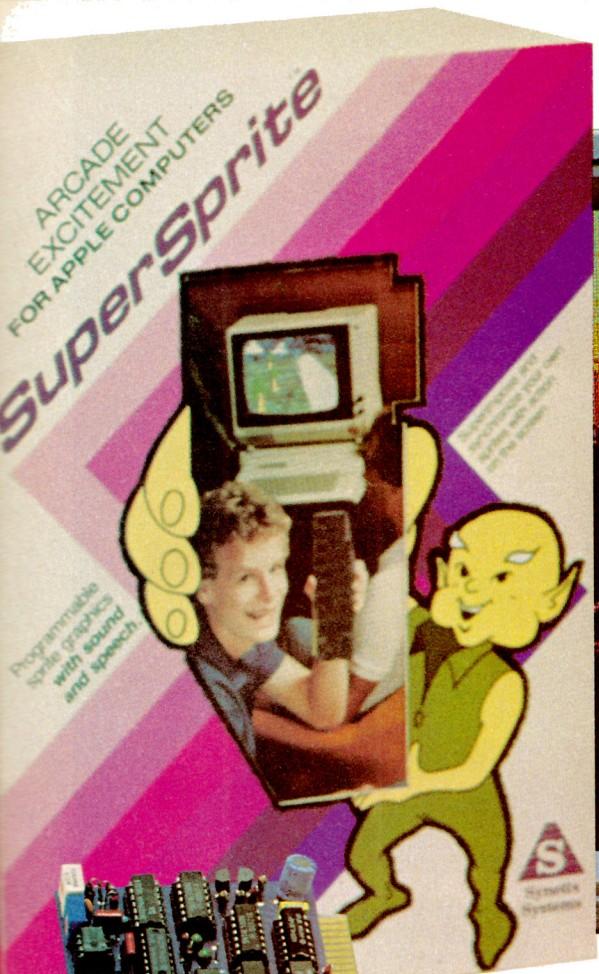
The AppleBus will let a number of Apple computers share common peripherals. One of these is a laser printer. Details were sketchy at press time, but Apple describes the pricing of their new laser printer as "very aggressive." Apple also will sell a number of file servers (shared hard disks) for the AppleBus. The first of these will be available by summer and will

have a capacity of 74 megabytes, with a 20-megabyte tape cartridge back-up (price: \$7000).

In addition, the Lisa 2/10's hard disk also can be shared among a number of machines connected by the AppleBus. Finally, Apple will supply a communications server allowing AppleBus-connected computers to communicate with other computers and networks such as the yet-unannounced IBM LAN.

The AppleBus supports a maximum of 16 nodes (the total number of computers and servers). For the price of cable and some transformer add-ons (\$15-\$25), any Macintosh or Lisa can join an AppleBus network. Apple IIs and IIIs require a special card in an expansion slot.

With the announcement of AppleBus, Apple Computer has plunged into the large and lucrative office automation business. They plan to market the AppleBus to medium-sized offices containing six to 40 people. The AppleBus, and the software needed to drive it, will be available this summer. ■



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Lisa 2



by Bob Ryan, inCider staff

When Apple introduced the Lisa computer last year, the machine was hailed as a breakthrough machine—one that redefined the concept of a personal computer. Before long, however, the Lisa's deficiencies began to show. The machine was slow to initialize new documents and offered limited cut and paste capability between applications. The Lisa also suffered from a paucity of software and, until recently, carried a \$10,000 price tag.

These drawbacks no longer matter. On January 24th, concurrent with the Macintosh announcement, Apple unveiled the *Lisa 2*, a machine which directly addresses the deficiencies of the Lisa 1. Apple expects the Lisa 2 to enjoy the kind of success which eluded its predecessor.

Three of a Kind

The Lisa 2 is available in three different configurations. The most obvious innovation in all three is the replacement of the two 5 1/4" minifloppy drives found in the Lisa 1 with a single 400K byte microfloppy drive. These microfloppy drives make the Lisa 2s media-compatible with the Macintosh.

Differences among the three new Lisa models are significant. The plain vanilla Lisa 2 comes with 512K bytes of RAM and a single microfloppy drive, and sells for \$3495. A classier model is the Lisa 2/5, which adds a 5 Mbyte Profile hard disk to the basic Lisa 2 configuration. This model sells for \$4495. At the top of the line is the Lisa 2/10. Instead of an external hard disk, the 2/10 has a 10 Mbyte internal

Winchester disk. The price of this model is \$5495.

Each of the new Lisas is expandable to 1 megabyte of RAM for an additional cost of \$1495. They all feature increased data transfer rates and improved hardware and software performance. Clearly, the new microfloppy drives and internal Winchester drive will help solve the Lisa 1's speed problems.

Moreover, Apple has announced that it will introduce new versions of the original Lisa software packages. This software will be faster, consume less space, and have more features than the present versions. New features include a spelling checker for LisaWrite and full arithmetic capabilities for LisaList. Most important, the new software will feature complete integra-

Photo 11.

The Lisa 2/10 with its 10 MB internal Winchester.

tion among all of the Lisa Desktop applications.

A Mac with Every Lisa

Paramount among the Lisa 2's attributes is that it will run Macintosh software. Apple has produced a new software package for the Lisa 2 called "MacAlike." When loaded into the Lisa's RAM, this software emulates the Macintosh ROM. MacAlike also will permit Macintosh software to take advantage of the Lisa's much greater memory and disk capacity. Lisa's ability to run Macintosh software increases the value of both machines and encourages large-scale software investments.

Apple has *not* forsaken owners of the original Lisa; they get a free upgrade to a Lisa 2/5. This upgrade includes a 3½-inch microfloppy drive to replace the minifloppy drives of the Lisa 1, and new versions of the Lisa Desktop software. Apple will perform the conversion free of charge through May. After June 1st, it will cost \$600.

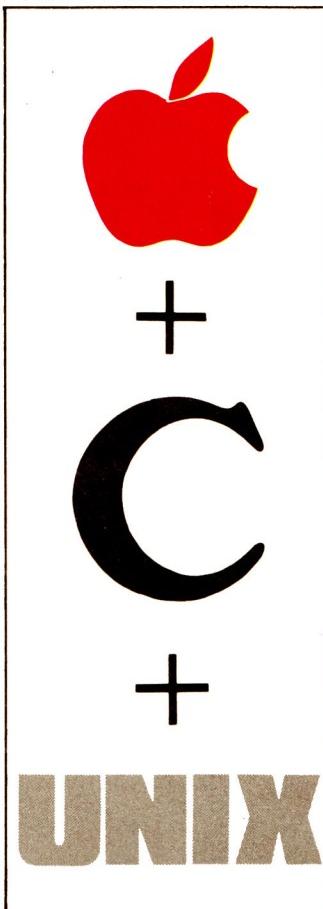
In addition, Apple will offer Lisa 1 owners the chance to further upgrade their machines to the Lisa 2/10 model. For less than \$2000, Lisa 1 owners can have their machines fitted with a 10 Mbyte hard disk.

Which Lisa?

Each of the new Lisa computers are designed for a different kind of user. The *Lisa 2* is meant for those who wish to run Macintosh software in a larger memory environment. The *Lisa 2/5* adds the capacity of a hard disk and, with a memory upgrade, can run Lisa Desktop software. Finally, the *Lisa 2/10* adds the speed and capacity of its big disk to both Macintosh and Lisa applications.

The Lisa computers also have capabilities the Macintosh lacks. MS-DOS will be available for the Lisas this year, and a board allowing them to emulate the Apple II reportedly is in the works.

Thus, without any price increase, Apple has greatly enhanced the performance and value of the Lisa computer. The Lisa 2 models go a long way toward fulfilling the promise of the Lisa 1. ■



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If you have toddlers around the house, you may have noticed that they are interested in the computer, but they are unable to use the machine because they do not yet read or even recognize letters and numbers. Commercial games for children are usually intended to teach letters and numbers or more complex skills. For some children, even these programs are too complex to start with. Starfrog and Flutterbye are creative, nonviolent, noncompetitive first programs for the earliest users.

Starfrog allows the child to launch a spaceship from its space station and guide it around the screen. The screen wraps around, so the child can move the spaceship freely. At any point on the screen, the child can press the space bar and the spaceship will create a star. (My 4-year-old daughter says the spaceship lays the stars the way a frog lays eggs.) The I-J-K-M keys move the spaceship.

To use Starfrog a child must learn to press one key at a time to make the ship move. This kind of self-control is foreign to most small children, and they tend to bang on the keyboard with their fists. They must also learn to plan ahead, to think about what they want on the screen and to press the appropriate key.

Flutterbye is more complicated. In it, the child guides a flapping butterfly around the screen using the I-J-K-M keys. If the child guides the butterfly to the top of one of the stems and presses the space bar, a flower appears on the stem. The child can get a new field of empty stems by pressing A. Each new field contains one stem more than the previous field, up to 10. To play with Flutterbye, a child needs to plan ahead a bit more than with Starfrog. Pressing the space bar alone, or just landing on a stem, does not produce a flower. Both operations must occur before the child gets a blossom.

To enter each program, turn on your computer and get into Basic. Type NEW to clear the memory, type in the Basic program as it is given in the listing, and save it under the appropriate name. Now type in the shape table. Type CALL -151 and press return to get into machine language. Type 4000: and then begin typing in the two-character hex codes in the appropriate shape table. You can enter over 200 characters and spaces before pressing return, but it is better to press return after every three lines or so. When you have typed in the table you can list it by typing 4000.4055 for Starfrog or 4000.40C3 for Flutterbye. When you are sure it is correct, save it to the disk containing the Basic program by typing BSAVE SHAPE:STARSHIP,A\$4000,L\$56 or BSAVE SHAPE:FLOWERS,A\$4000,L\$C4. Each Basic program will load its shape table when you run it.

Flutterbye checks in line 45 to see if it has its shape table in memory. This

Starfrog and Flutterbye

These two games are written especially for very young children. They don't destroy alien spaceships or escape from monsters. Instead, they create stars or flowers.

by Michael A. Seeds

means it can be stopped and rerun without loading the table every time. Starfrog does not make this check, so it must load its table every time.

You can also remove line 1025 from Flutterbye. That line allows you to stop the program by typing E—a useful feature during testing—but a child can end the program with an accidental keypress. Remove line 1025 and the program will ignore incorrect keypresses.

You might like to add some sound to Starfrog. Space is silent, but a click or beep now and then might be fun. You can click the speaker with a POKE 49200,0 or you could use a short music subroutine such as that described in

Michael Seeds writes programs for his 4-year-old daughter. He is an associate professor of astronomy at the Joseph R. Grundy Observatory. You can write to him at Franklin & Marshall College, PO Box 3003, Lancaster, PA 17604.

Listing 1. Starfrog.

```
10 DIM SI(20)
20 DATA 20,20,20,20,20,19,19,19,18,18,17,17,16,15,14,13,12,11,9,6
30 FOR K = 1 TO 20: READ SI(K): NEXT
40 HOME : VTAB 12: HTAB 17: PRINT "STARSHIP"
50 PRINT CHR$(4); "BLOAD SHAPE:STARSHIP"
60 POKE 232,0: POKE 233,64
70 XO = 140: YO = 80: DI = 1
80 HGR : POKE - 16302,0: HCOLOR= 3: SCALE= 1: ROT= 0
95 REM DRAW SPACE STATION
100 FOR K = 1 TO 20
120 HPLOT XO - SI(K),YO - K: HPLOT XO + SI(K),YO - K
130 HPLOT XO - SI(K),YO + K: HPLOT XO + SI(K),YO + K
140 NEXT K
150 HPLOT XO - 20,YO: HPLOT XO + 20,YO
155 X = XO: Y = YO
160 XDRAW 2 AT X,Y: REM DRAW SHIP
1000 HOME : REM BEGIN MAIN LOOP
1010 GET A$: PRINT "": POKE 49200,0
1020 IF A$ = " " THEN GOSUB 2000
1030 XDRAW 2 AT X,Y: REM ERASE SHIP
1040 IF A$ = "I" THEN Y = Y - 4
1050 IF A$ = "J" THEN X = X - 4: DI = - 1
1060 IF A$ = "K" THEN X = X + 4: DI = 1
1070 IF A$ = "M" THEN Y = Y + 4
1080 IF X > 279 THEN X = 0
1090 IF X < 0 THEN X = 279
```

Listing continued.

"We want to design creative, noncompetitive games for the very youngest computer people."

Listing 1 continued.

```

1100 IF Y > 191 THEN Y = 0
1110 IF Y < 0 THEN Y = 191
1125 ROT= 0: IF DI > 0 THEN ROT= 32
1130 XDRAW 2 AT X,Y: REM DRAW SHIP
1150 GOTO 1000
1900 REM
1910 REM
2000 REM DRAW A STAR
2010 XS = X - DI * 11: ROT= 0
2020 IF XS > 279 THEN XS = XS - 279: GOTO 2020
2030 IF XS < 0 THEN XS = XS + 279: GOTO 2030
2040 XDRAW 1 AT XS,Y: REM DRAW STAR
2045 IF DI > 0 THEN ROT= 32
2050 RETURN

```

```

4000- 02 00 06 00 21 00 DB DB
4008- 68 B6 92 C5 09 24 24 24
4010- 08 18 48 36 36 36 B6 51
4018- 24 24 6C 2E 08 9E 93 32
4020- 00 DB DB DB 63 08 36 36
4028- 4E 24 24 24 8C 31 36 36
4030- 76 08 20 24 64 0A 36 36
4038- 4E 24 24 24 C4 49 36 36
4040- 36 36 36 0E 08 AC 69 C4
4048- 19 18 08 18 18 08 18 18
4050- 30 C5 09 0D 06 00

```

Listing 2. Starfrog shape table.

Listing 3. Flutterbye.

```

10 DIM SX(20),SY(20)
20 SU = 0:NF = 5
40 HOME : VTAB 12: HTAB 17: PRINT "FLUTTERBYE"
45 FOR J = 1 TO 15:SU = SU + PEEK (16383 + J): NEXT J: IF SU = 595 THEN
   60
50 PRINT CHR$ (4); "BLOAD SHAPE:FLOWERS"
60 POKE 232,0: POKE 233,64:X = 140:Y = 80
70 NS = 0
80 HGR : POKE - 16302,0: HCOLOR= 3: SCALE= 1: ROT= 0
90 IF NF > 10 THEN NF = 10
95 SX(1) = 15 + 2 * INT (124.5 * RND (1)): SY(1) = 110 + 75 * RND (1)
100 FOR K = 2 TO NF
110 SX(K) = 15 + 2 * INT (124.5 * RND (1)): GOSUB 4000
115 IF ST = 1 THEN 110
120 SY(K) = 110 + 75 * RND (1)
140 NEXT K
150 FOR K = 1 TO NF: HPLOT SX(K),191 TO SX(K),SY(K): NEXT K
155 XN = X:YN = Y
160 XDRAW 1 AT X,Y: REM DRAW BUG 1
1000 HOME
1010 GET A$: PRINT "": POKE 49200,0
1020 IF A$ = " " THEN GOSUB 2000
1022 IF A$ = "A" THEN NF = NF + 1: GOTO 70
1025 IF A$ = "E" THEN TEXT : HOME : END
1030 XDRAW 1 AT X,Y:SP = PEEK (49200): REM ERASE BUG 1
1040 IF A$ = "I" THEN YN = Y - 4
1050 IF A$ = "J" THEN XN = X - 4
1055 XDRAW 2 AT X,Y: REM DRAW BUG 2
1060 IF A$ = "K" THEN XN = X + 4
1070 IF A$ = "M" THEN YN = Y + 4
1080 IF XN > 279 THEN XN = 0

```

Listing 3 continued.

the program Laughing Bear (*inCider* September 1983, p. 32).

Another thing to work on is the colors. The spaceship and stars in Starfrog are brightly colored and you can do some tricks by sending the spaceship off the edge of the screen or by "laying" one star on top of the other. But the colors in Flutterbye are limited. The flower stems are green, but the butterfly and flowers are all white. You could build a new set of shape tables for either program and improve the colors.

You may be tempted to add a score-keeping feature, but think about it first. These games are for very small children and such little people do not need to be competitive. They will learn that soon enough. Also, you could add a laser cannon to the spaceship and let it blast stars or invading bugs. You could even make the butterfly zap flowers, but again remember the children. They don't need to learn violence and destruction yet. Let them create rather than destroy.

Notice that the main structure of these two programs is the same. You could make up a new shape table and let the child guide a mouse through a maze to eat the cheese. You could even number or letter the cheese bits to teach the child some literacy skills. You could add numbered space stations that must be visited in order. The possibilities are endless, but remember our goal. We want to design creative, non-violent, noncompetitive games for the very youngest computer people. First games have to be simple.

Last but not least, don't be surprised if your child spends only a few minutes creating stars or flowers. Little people have little attention spans. The most important feature of these programs is your cheerful, supportive, low-pressure attitude. If your children enjoy the experience of working with you and with your computer, they will return to the games again and again. ■

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```

1090 IF XN < 0 THEN XN = 279
1095 XDRAW 2 AT X,Y:SP = PEEK (49200): REM ERASE BUG 2
1100 IF YN > 189 THEN YN = 189
1110 IF YN < 10 THEN YN = 10
1130 X = XN:Y = YN
1140 XDRAW 1 AT X,Y: REM DRAW BUG 1
1150 GOTO 1000
1990 REM =====
1995 REM DRAW FLOWER
1999 REM =====
2000 GOSUB 3000: ROT= 0:RF = 4: IF TF = 0 THEN 2100
2010 IF RND (1) > .5 THEN RF = 5
2020 XDRAW RF AT XF,YF
2040 IF RND (1) > .5 THEN XDRAW 3 AT XF,YF
2050 IF RF = 4 THEN ROT= 16: XDRAW RF AT XF,YF: ROT= 0
2100 RETURN
2990 REM =====
2995 REM BUG NEAR A STEM?
2999 REM =====
3000 TF = 0: FOR J = 1 TO NF
3010 DI = ABS (SX(J) - X)
3020 IF DI > 4 THEN 3040
3030 DI = ABS (SY(J) - Y)
3040 IF DI < 5 THEN TF = 1:XF = SX(J):YF = SY(J):J = NF
3050 NEXT J
3060 RETURN
3990 REM =====
3995 REM STEM NEAR STEM?
3999 REM =====
4000 ST = 0: FOR J = 1 TO K - 1
4010 DI = ABS (SX(J) - SX(K))
4020 IF DI < 10 THEN ST = 1
4040 NEXT J
4050 RETURN

```

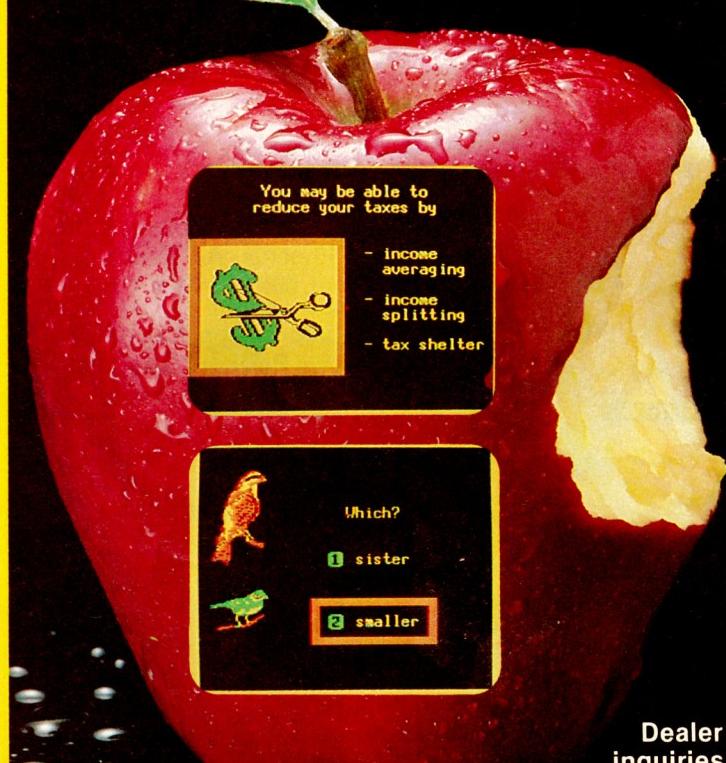
Listing 4. Flutterby shape table.

4000.40C3

4000-	05	00	0C	00	40	00	63	00
4008-	69	00	91	00	3F	3F	27	27
4010-	27	3C	24	2C	24	25	2D	2D
4018-	35	35	36	3E	36	36	35	2D
4020-	2D	25	25	25	24	24	3C	3C
4028-	3C	37	37	36	36	37	2E	36
4030-	2E	2D	2D	3E	3F	3F	3F	3F
4038-	3F	3F	27	2D	2D	2D	00	00
4040-	3F	3F	27	3F	24	2D	2C	2D
4048-	2E	35	36	2D	2D	2C	25	27
4050-	3F	37	36	2E	2D	2D	3E	3F
4058-	3F	3F	3F	3F	3F	2C	2D	2D
4060-	2D	05	00	27	2D	36	3F	07
4068-	00	1B	24	2D	2D	36	36	3F
4070-	3F	3C	3E	37	3F	27	3F	27
4078-	27	2C	2C	25	2D	2E	2D	4D
4080-	D9	4B	49	29	25	2D	2E	35
4088-	2D	36	3F	3E	37	3F	3C	37
4090-	00	1B	3F	3F	2C	2D	25	3C
4098-	3C	3C	2C	35	35	2D	24	24
40A0-	35	36	2E	25	25	2D	3E	3E
40A8-	36	2E	2D	35	3F	3F	36	35
40B0-	35	35	3F	3C	3C	3C	36	36
40B8-	27	24	3C	37	37	3F	2C	*
40C0-	2C	2C	2C	00				

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★ PRESIDENTIAL

Remember the old saw about every child can
be President? Well, here's your chance.
But remember, we never promised
you a rose garden.

by Joel J. Davis

Presidential Power is a strategy game that uses the Apple's full capacities as a thinking opponent. In Presidential Power you, the Democrats, are pitted against the knowledgeable and campaign-savvy Republicans. It will take all your cunning and insight to win the next presidential election. Your destiny is in your own hands. There is very little "random chance" in Presidential Power; the outcome is highly dependent upon your own skill.

First, let's discuss the game and its operation, and then examine specific program features for potential customization.

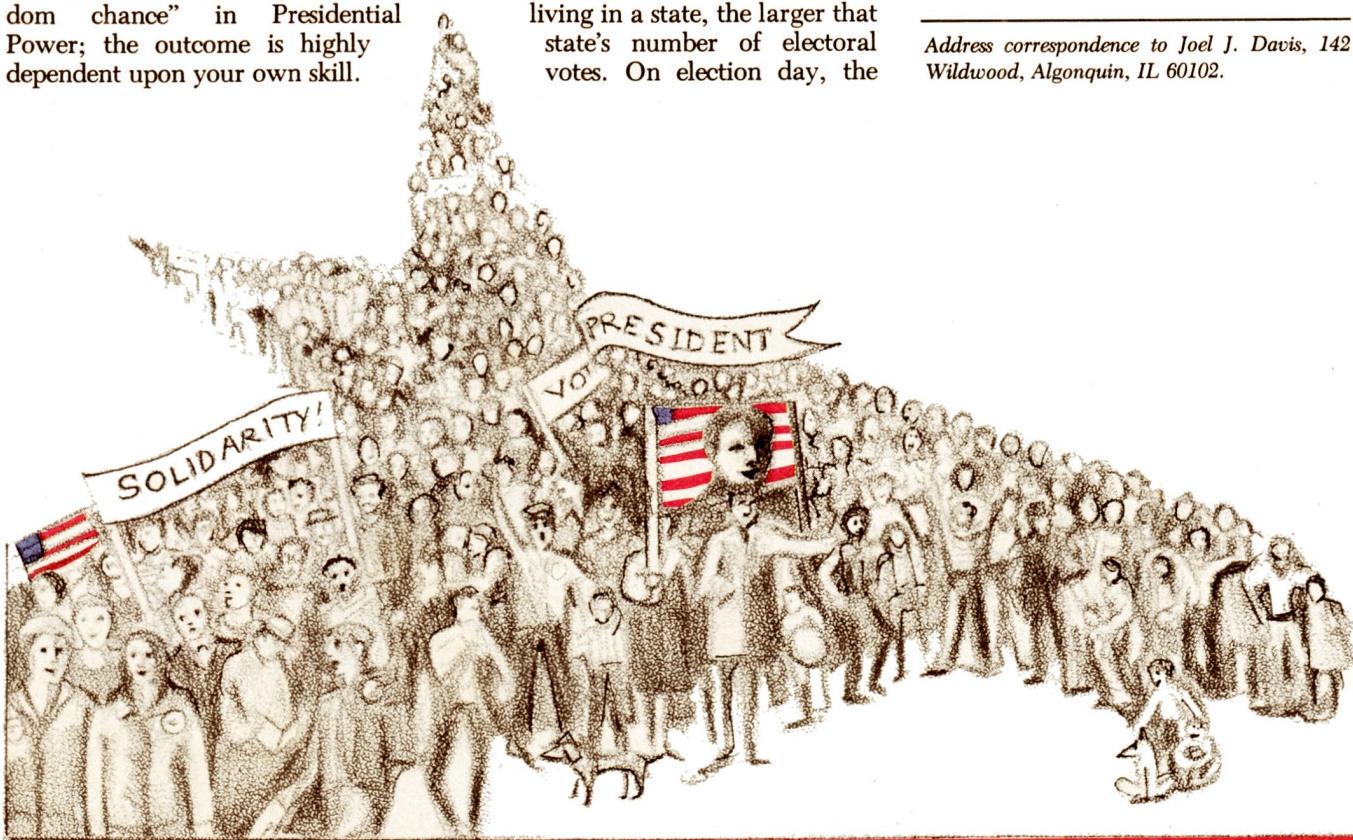
Objective

Presidential Power is faithfully based upon national presidential elections. Each state has a set number of electoral votes—the more people living in a state, the larger that state's number of electoral votes. On election day, the

party that receives the most votes in a state receives that state's electoral votes. The object of Presidential Power, therefore, is for you to win the national election by winning a majority of electoral votes. There are 538 total electoral votes; it takes 270 to win the election.

Remember, as in any presidential

Address correspondence to Joel J. Davis, 142 Wildwood, Algonquin, IL 60102.



POWER



election, you can win more states than your opponent and have a larger national vote total than your opponent and still *lose* the election. Having more electoral votes is the key.

Many different strategies can deliver the majority of electoral votes. The challenge of Presidential Power is finding your own winning strategies.

Factors Influencing the Outcome

As in any election, success in any state depends upon a number of fac-

tors, namely:

1. The strength of your local campaign organization.
2. Support of local politicians.
3. Effectiveness of the media (newspaper, television, radio, etc.) you select to communicate your campaign message.
4. Effectiveness of the message you decide to communicate (issue-oriented, personal attack on your opponent, etc.).
5. Number of people in the state still

undecided.

6. Deals made along the way.

During play these factors interact and influence the outcome. Each is discussed in the upcoming sections.

Playing Presidential Power

Three separate programs comprise Presidential Power: Set Up, Campaign and Results. Three programs were used so that the main program takes up less than 48K. Type in each program as shown and save under the



Listing 1. Presidential Power Set Up.

```

10 DIM VOTE(2,51),FEE(2,51),MN(2,51),EL(51),NA$(51): DIM
    V(6,51),W(5,51),CS(8),WT(4):A9$(1) = "0313110406100
    50109070212":A9$(2) = "1526292324161419272117182813
    252022":A9$(3) = "31383532373936333430":A9$(4) = "4
    84947454440504643514241"
20 HOME : PRINT "INPUT ANY NUMBER AND PRESS RETURN": INPUT
    NU: FOR X = 1 TO NU:Y = RND (X): NEXT X: HOME : HOME
    : VTAB (12): HTAB (12): FLASH : PRINT "PERFORMING S
    ET UP": NORMAL : VTAB (15): PRINT "DETERMINING INIT
    IAL VOTE COUNTS/STATE"
30 REM CALCULATE INITIAL VOTE COUNTS
40 R = 1250000: FOR X = 1 TO 51:RR = RND (X):R1 = RND
    (X):VOTE(1,X) = INT (RR * R):VOTE(2,X) = INT (R1 *
    R): NEXT X: REM CALCULATE LOCAL POLITICAL SUPPORT
50 PRINT "SETTING INITIAL LOCAL POLITICAL SUPPORT": FOR
    X = 1 TO 51:FEE(1,X) = RND (X) + RND (X):FEE(2,X)
    = RND (X) + RND (X): NEXT X: PRINT "SETTING LEVE
    LS FOR STATE ORGANIZATIONS": FOR X = 1 TO 51: FOR Y
    = 1 TO 2
60 MM = RND (X): IF MM < .65 THEN GOTO 60
70 IF EL(X) < 7 THEN MN(Y,X) = MM * 80000: GOTO 130
80 IF EL(X) < 13 THEN MN(Y,X) = MM * 95000: GOTO 130
90 IF EL(X) < 20 THEN MN(Y,X) = MM * 115000: GOTO 130
100 IF EL(X) < 26 THEN MN(Y,X) = MM * 135000: GOTO 130
110 IF EL(X) < 32 THEN MN(Y,X) = MM * 150000: GOTO 130
120 MN(Y,X) = MM * 200000: GOTO 130
130 NEXT Y:MN(1,X) = INT (MN(1,X)):MN(2,X) = INT (MN(
    2,X)): NEXT X: REM CALCULATE VALUE OF MEDIA AND IS
    SUES
140 PRINT "DETERMINING MEDIA AND TACTIC VALUES": FOR X =
    1 TO 51: FOR Y = 1 TO 4:V(Y,X) = RND (X):W(Y,X) =
    RND (Y): NEXT Y: NEXT X: GOSUB 270: PRINT "READING
    IN STATE NAMES": FOR X = 1 TO 51: READ NA$(X): NEXT
    X
150 REM READ IN ELECTORAL VOTES
160 PRINT "READING IN ELECTORAL VOTE": FOR X = 1 TO 51:
    READ EL(X): NEXT X: REM MEDIA/TACTIC NAMES
170 PRINT "READING MEDIA/TACTIC NAMES": FOR X = 1 TO 8:
    READ CS(X): NEXT X
180 HOME : PRINT "TYPE IN LEVEL OF DIFFICULTY ... ": PRINT
    : PRINT "SELECT ANY NUMBER FROM 1 (HARDEST) TO": PRINT
    "10 (EASIEST)": PRINT : INPUT "MAKE YOUR SELECTION
    HERE -- ";LD: IF LD < = 0 OR LD > 10 THEN GOTO 18
    0
190 HOME : VTAB (12): HTAB (12): PRINT "STORING RESULTS
    ": PRINT CHR$(4); "OPEN PARAMETERS": PRINT CHR$(4);
    "WRITE PARAMETERS": PRINT LD: PRINT A9$(1): PRINT
    A9$(2): PRINT A9$(3): PRINT A9$(4): FOR X = 1 TO 8:
    PRINT CS(X): NEXT X
200 FOR X = 1 TO 51: FOR Y = 1 TO 2: PRINT VOTE(Y,X): PRINT
    FEE(Y,X): PRINT MN(Y,X): NEXT Y: PRINT NA$(X): PRINT
    EL(X): NEXT X: FOR X = 1 TO 51: FOR Y = 1 TO 5: PRINT
    W(Y,X): NEXT Y: NEXT X
210 FOR X = 1 TO 51: FOR Y = 1 TO 6: PRINT V(Y,X): NEXT
    Y: NEXT X: PRINT ZZ$: PRINT ZX$: PRINT ZC$: PRINT Z
    DS: FOR X = 1 TO 4: PRINT WT(X): NEXT X: PRINT CHR$(
    4); "CLOSE PARAMETERS"
220 HOME : VTAB (12): HTAB (7): INVERSE : PRINT "LOADIN
    G MAIN PROGRAM ...": NORMAL : PRINT CHR$(4); "RUN
    CAMPAIGN": DATA "ALABAMA", "ARKANSAS", "FLORIDA", "GE
    ORGIA", "KENTUCKY", "LOUISIANA", "MISSISSIPPI", "N. CA
    ROLINA", "S. CAROLINA"
230 DATA "TENNESSEE", "VIRGINIA", "W. VIRGINIA", "ALASK
    A", "ARIZONA", "CALIFORNIA", "COLORADO", "HAWAII", "MONT
    ANA", "NEBRASKA": DATA "NEVADA", "NEW MEXICO", "N.
    DAKOTA", "OKLAHOMA", "OREGON", "S. DAKOTA", "TEXAS", "U
    TAH", "WASHINGTON", "WYOMING"
240 DATA "IDAHO", "ILLINOIS", "INDIANA", "IOWA", "KANSAS"
    , "MICHIGAN", "MINNESOTA", "MISSOURI", "OHIO", "WISCONS
    IN", "CONNECTICUT", "DELAWARE", "DC", "MAINE", "M
    ARYLAND", "MASSACHUSETTS", "N. HAMPSHIRE", "N. JERSEY"
    , "NEW YORK"
250 DATA "PENNSYLVANIA", "RHODE ISLAND", "VERMONT": DATA
    9, 6, 17, 12, 9, 10, 7, 13, 8, 10, 12, 6, 3, 6, 45, 7, 4, 4, 5, 3, 4, 3
    , 8, 6, 4, 26, 4, 9, 3, 4, 26, 13, 8, 7, 21, 10, 12, 25, 11, 8, 3, 3, 4,
    10, 14, 4, 17, 41, 27, 4, 3
260 DATA "NEWSPAPERS", "TELEVISION", "DIRECT MAIL", "PERS

```

Listing continued.

name indicated.

To begin, RUN Set Up. This program takes about two minutes to set all program parameters. Because you set new parameters each time you run this program, there are an infinite number of playing scenarios.

This program requests you to set the "depth of knowledge and skill" your computer opponent will have. The computer skill levels run from slightly crafty (level 10) to almost unbeatable (level 1). Once parameters have been set and the difficulty level selected, data is stored in a text file (PARAMETERS). Campaign is automatically loaded, values are passed to the main program (taking about 90 seconds) and the campaign begins. (Note: To replay a game given the most recent scenario, skip running Set Up and go directly to running Campaign.)

The Campaign

The first thing you'll see is the relative amount of local political support each party currently has in each state within each of four U.S. geographical regions. (This is one of the parameters set prior to play.) Figures within each state add up to 100, and represent the percent of local politicians within a state supporting each party. Naturally, your campaign will be more effective in states where you have more local support than your opposition, and more difficult where you have less support.

Throughout the campaign, local support will fluctuate. Local politicians will attempt to "jump on the leading party's bandwagon" or join the "party with momentum." Each time local politicians reevaluate their positions the Apple will show the results.

Next you'll see the Main Menu, where your choices are:

1. Fund Raising
2. Examine/Build Local Organizations
3. Campaign In Selected States
4. Cease Campaign

You can select on any turn options 1 and 2 (in any order, for any number of times) and/or 3, but, you must end each turn by campaigning (option 3),

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Listing continued.

```

ONAL APPEARANCES": DATA "SPEAK ON ISSUES", "PERSO
NAL ATTACK ON OPPONENT", "GENERAL PROMISES", "SPECIFI
C PROMISES": HOME
270 REM CALCULATE HIGHEST VALUES
280 FOR X = 1 TO 51: FOR Z = 1 TO Ø STEP -.1: FOR Y =
1 TO 4: IF V(Y,X) > Z THEN Z1 = V(Y,X) -.001:V(5,X
) = V(Y,X):R = Y: GOTO 300
290 NEXT Y: NEXT Z
300 FOR Z = Z1 TO Ø STEP -.1: FOR Y = 1 TO 4: IF R =
Y THEN GOTO 320
310 IF V(Y,X) > Z THEN V(6,X) = V(Y,X): GOTO 330
320 NEXT Y: NEXT Z
330 NEXT X: FOR X = 1 TO 51: FOR Z = 1 TO Ø STEP -.1:
FOR Y = 1 TO 4: IF W(Y,X) > Z THEN W(5,X) = W(Y,X)
: GOTO 350
340 NEXT Y: NEXT Z
350 NEXT X: FOR Y = 1 TO 4: FOR X = 1 TO 51:WT(Y) = WT(
Y) + W(Y,X): NEXT X: NEXT Y:ZZ$ = "ARE YOU A (R)EPU
BLICAN":ZX$ = "OR A (D)EMOCRAT":ZC$ = "PRESS
(R) OR (D)":ZD$ = "PRESS ANY KEY TO CONTINUE ... ":
RETURN

```

after which the computer takes its turn.

Let's look at each of these options.

Fund Raising

The Republicans start the campaign with \$40 million, the Democrats with \$42 million. This option lets you increase the amount of funds in your treasury. Naturally, the more funds in your treasury, the better. You can attempt to raise funds at any time during the campaign, but are limited to five fund-raising efforts.

Of course, nothing is free; you must pay for the fund-raising effort. (After all, it takes money to raise money.) The minimum amount you must commit is \$1 million; the maximum amount is \$9,999,999. The greater the amount you commit, the greater the potential profit (or loss). As in the real world, fund raising returns typically reflect a party's popular support. Therefore, the greater the popular sentiment behind a party, the greater the likelihood for a positive return on investment.

To raise funds, select Option 1 from the Main Menu and input the amount of funds you wish to commit. (Pressing Return isn't necessary.) Next, confirm your choice or change your mind. Once you "prime the pump" the computer will display the total number of dollars you committed and raised, your net profit (or loss) and the updated treasury balance.

Building Local Campaign Organizations

In order to win any election, a first-rate local campaign organization is a necessity. This option lets you build an organization in each state and region of the country.

Local organizations need money to operate, so you build an organization through the commitment of funds from your treasury. When you choose this option from the Main Menu, a second menu displaying your choices under this option will be displayed.

To see the current status of your organization in the states in any particular region of the country:

1. Select option "1."
2. Select the region you want to exam-

Listing 2. Presidential Power Campaign.

```

10 DIM KY(51),M(51),FEE(2,51),VOTE(2,51),NA$(51),EL(5
1),PA(51),MN(2,51),TT(2,51),P6(51),V(6,51),W(5,51
),C$(8):PL = 2:ET = 200000:DT = 75:FF$ = "TOO CLO
SE TO CALL":A7 = RND (10) * 5000000:F3 = RND (1
1) * 3
20 FOR X = 1 TO 51:PA(X) = .99: NEXT X: HOME : VTAB (
12): HTAB (9): PRINT "CONTINUING SET UP":DE = 420
Ø00000:RE = 40000000: PRINT CHR$ (4); "OPEN PARAME
TERS": PRINT CHR$ (4); "NOMON C,I,O": PRINT CHR$ (
4); "READ PARAMETERS"
30 INPUT LD: FOR X = 1 TO 4: INPUT A9$(X): NEXT X: FOR
X = 1 TO 8: INPUT C$(X): NEXT X: FOR X = 1 TO 51:
FOR Y = 1 TO 2: INPUT VOTE(Y,X): INPUT FEE(Y,X):
INPUT MN(Y,X): NEXT Y: INPUT NA$(X): INPUT EL(X)
: NEXT X: FOR X = 1 TO 51
40 FOR Y = 1 TO 5: INPUT W(Y,X): NEXT Y: NEXT X: FOR
X = 1 TO 51: FOR Y = 1 TO 6: INPUT V(Y,X): NEXT Y
: NEXT X: INPUT ZZ$: INPUT ZX$: INPUT ZC$: INPUT
ZVS$: PRINT CHR$ (4); "CLOSE PARAMETERS": HOME : GOSUB
2710: GOTO 70
50 IF E5 = Ø THEN J = Ø
60 RETURN
70 FG = Ø:SHAN = RND (X):X = FRE (Ø):DE = INT (DE):
RE = INT (RE):N(1) = INT (N(1)):N(2) = INT (N(
2)): GOSUB 820: IF DE < Ø THEN DE = Ø
80 IF REPBAL < Ø THEN REPBAL = Ø
90 IF SHAN < .09 THEN SH = Ø: HOME : GOSUB 2590
100 IF HB = 1 THEN HB = Ø: HOME : VTAB (12): HTAB (13
): FLASH : PRINT "COMPUTER'S TURN": NORMAL : GOTO
2920
110 GOSUB 3330: HOME : HTAB (16): FLASH : PRINT "OPTI
ONS": NORMAL : PRINT : PRINT : PRINT "(1) FUND R
AISING": PRINT "(2) BUILD LOCAL ORGANIZATIONS":
PRINT "(3) CAMPAIGN IN SELECTED STATES": PRINT
"(4) CEASE CAMPAIGN"
120 PRINT : PRINT "PRESS THE NUMBER OF YOUR CHOICE ..
.": VTAB (1): HTAB (18): GET X$:X = VAL (X$): IF
X > 4 OR X = Ø THEN GOTO 110
130 ON X GOTO 160,460,1560,140
140 HOME : PRINT "ARE YOU SURE - PRESS 'Y'": PRINT : GET
T$: IF T$ < > "Y" THEN GOTO 110
150 GOTO 2810
160 HOME : FLASH : VTAB (1): HTAB (15): PRINT "FUND R
AISING": NORMAL : PRINT : PRINT : PRINT : GOSUB 2
580
170 IF D$ = "R" THEN HOME : PRINT "NO..NOT ALLOWED":
PRINT : PRINT "THE COMPUTER PLAYS THE REPUBLICAN
S": FOR X = 1 TO 1000: NEXT X: GOTO 70
180 IF D$ = "D" THEN CNT = CNT + 1: GOTO 210
190 IF D$ = "R" THEN RVT = RVT + 1: GOTO 210
200 GOTO 160
210 PRINT : IF D$ = "D" AND CNT > 5 THEN GOTO 260
220 PRINT : IF D$ = "R" AND RVT > 5 THEN GOTO 260
230 HOME : PRINT : X = RND (Y)
240 PRINT "YOU MUST ALLOCATE SOME OF YOUR FUNDS ": PRINT

```

Listing continued.

Listing continued.

```
"TO FUND THE FUND RAISING EFFORT": PRINT : PRINT
"THE MINIMUM AMOUNT YOU MUST SPEND": PRINT "IS $1
,000,000": PRINT : PRINT "THE MAXIMUM AMOUNT YOU
MAY SPEND"
250 PRINT "IS $9,999,999": FOR X = 1 TO 4500: NEXT : HOME
: GOTO 270
260 HOME : PRINT "YOU HAVE TRIED RAISING FUNDS TOO OF
TEN!": PRINT "YOU MAY NOT TRY -- PRESS RETURN ": GET
K$: GOTO 70
270 IF DS = "D" THEN AVAIL = DEMBAL
280 IF DS = "R" THEN AVAIL = REPBAL
290 WG$ = STR$ (AVAIL): GOSUB 2830: PRINT WG$" DOLLAR
S ARE AVAILABLE": IF AVAIL < 1000000 THEN FLASH
: PRINT : PRINT TAB( 10)"YOU DON'T HAVE ENOUGH M
ONEY": NORMAL : PRINT : PRINT : GOTO 440
300 PRINT : PRINT "AMOUNT OF FUNDS ARE TO BE COMMITTE
D?": PRINT : PRINT "ENTER THE AMOUNT IN THE BOX B
ELOW...": VTAB (15): HTAB (15): PRINT "$": VTAB (
15): HTAB (16): INVERSE : PRINT "": VTAB
(15): HTAB (16)
310 VTAB (15): HTAB (16): GET C1$: PRINT C1$:: VTAB (
15): HTAB (17): PRINT ",": VTAB (15): HTAB (18): GET
C2$: PRINT C2$: VTAB (15): HTAB (19): GET C3$: PRINT
C3$
320 VTAB (15): HTAB (20): GET C4$: PRINT C4$: VTAB (1
5): HTAB (21): PRINT ",": VTAB (15): HTAB (22): GET
C5$: PRINT C5$: VTAB (15): HTAB (23): GET C6$: PRINT
C6$: VTAB (15): HTAB (24): GET C7$: PRINT C7$
330 C8$ = C1$ + C2$ + C3$ + C4$ + C5$ + C6$ + C7$: IN =
VAL (C8$): NORMAL : IF IN < 1000000 THEN HOME :
GOTO 230
340 VTAB (21): PRINT "DO YOU WISH TO ALLOCATE $"C1$",
"C2$C3$C4$", "C5$C6$C7$": PRINT "PRESS (Y) OR (N)": GET
T$: IF T$ < > "Y" THEN HOME : GOTO 290
350 IF INVEST < = (AVAIL) THEN GOTO 370
360 FLASH : PRINT : PRINT "YOU DON'T HAVE THAT MUCH!!
!": NORMAL : PRINT : PRINT "PRESS ANY KEY...": GET
T$: HOME : GOTO 290
370 AV = AV - IN: FOR CC = 1 TO 51: CM(1) = CM(1) + VOT
E(1,CC): CM(2) = CM(2) + VOTE(2,CC): NEXT CC: CD =
CM(1) / (CM(1) + CM(2)): IF AM = 1 THEN CD = .24
380 IF CD > = .5 THEN MAKE = INT (IN * (CD + .21 +
RND (X))): GOTO 400
390 MAKE = INT (((CD - .05) + RND (X)) * IN)
400 HOME : AM = 1: WG$ = STR$ (MAKE): GOSUB 2830: PRINT
"YOUR TOTAL RETURN IS ...": PRINT : INVERSE : HTAB
(15): PRINT "$WG$": NORMAL : PRINT : PRINT
410 G = (MAKE - INVEST): WG$ = STR$ (G): GOSUB 2830: PRINT
"YOUR NET RETURN IS ....": PRINT : INVERSE : HTAB
(15): PRINT "$WG$": NORMAL : PRINT : AVAIL = AVAIL
+ MAKE: PRINT : IF DS = "R" THEN REPBAL = AVAIL
420 IF DS = "D" THEN DEMBAL = AVAIL
430 DEMBAL = INT (DEMBAL): REPBAL = INT (REPBAL): WG$ =
STR$ (AVAIL): GOSUB 2830: PRINT "YOUR CURRENT DO
LLAR LEVEL IS...": PRINT : INVERSE : HTAB (15): PRINT
"$WG$": NORMAL : IF FL = 1 THEN FOR X = 1 TO 150
Ø: NEXT : RETURN
440 VTAB (23): PRINT ZV$: GET K$
450 GOTO 70
460 POKE 34,0: HOME : FLASH : VTAB (1): HTAB (4): PRINT
"BUILDING CAMPAIGN ORGANIZATIONS": NORMAL : PRINT
: PRINT : GOSUB 2580: IF DS = "D" OR DS = "R" THEN
GOTO 480
470 HOME : GOTO 460
480 IF DS = "R" THEN HOME : PRINT "NO..NOT ALLOWED":
PRINT : PRINT "THE COMPUTER PLAYS THE REPUBLICAN
S": FOR X = 1 TO 750: NEXT X: GOTO 70
490 POKE 34,0: HOME : NORMAL : PRINT : FLASH : PRINT
"OPTIONS": NORMAL : PRINT : PRINT
493 PRINT "OPTIONS 1 OR 2 LET YOU BUILD OR EXAMINE": PRINT
"THE STRENGTH OF YOUR LOCAL": PRINT "CAMPAIGN ORG
ANIZATION IN": VTAB (7): HTAB (26): INVERSE : PRINT
"ANY": NORMAL : VTAB (7): HTAB (30): PRINT "REGIO
N": PRINT : PRINT
495 PRINT TAB( 5)"1. BUILD/EXAMINE AN ENTIRE REGION
": PRINT TAB( 5)"2. BUILD A SINGLE STATE": PRINT
TAB( 5)"3. RETURN TO MAIN MENU"
500 PRINT : PRINT "ENTER THE NUMBER OF YOUR CHOICE ..
": VTAB (2): HTAB (1): GET JF$: JF = VAL (JF$):
IF JF = 3 THEN GOTO 450
510 IF JF = Ø OR JF > 3 THEN GOTO 480
520 IF DS = "R" THEN AV = REPBAL: Y = 2
530 IF DS = "D" THEN AV = DEMBAL: Y = 1
540 HOME : PRINT : FLASH : PRINT "DOLLAR ALLOCATION "
: NORMAL : PRINT : PRINT : PRINT "OPTIONS": PRINT
: PRINT TAB( 5)"1. SOUTH": PRINT TAB( 5)"2. WES
```

Listing continued.

ine from the next menu. Input the corresponding number.

3. Press Return when done examining the region.

When examining a region, the computer will tell you if your organization in any particular state can sufficiently support the candidate in a state of that size. The state listing should be interpreted as follows:

1. Column 1 is the state name.
2. Column 2 is the amount of funds currently committed to that state (in thousands of dollars).
3. Column 3 reports the adequacy of the local organization in each state. A "+" indicates superior strength; a "-" indicates an inadequate organization; lack of a symbol indicates an organization of sufficient strength and development.

To build or rebuild local organizations, decide whether to build them all at once in an entire region, or only in specific states within a region. Indicate your choice on the menu (options 1 and 2 respectively) and then select the appropriate region. After the state display, if you still wish to build organizations, press "A" (for "Add Funds"). If you've changed your mind after seeing the status display, press Return to go back to the Main Menu.

As noted earlier, you build organizations by committing funds from your treasury. If you are building in all states in a region all at once, input the amount of funds you are committing to the region. This amount will be divided equally among all states in the region. If you are building a single state, respond to screen prompts (for name of state and the amount to be committed entirely to that individual state). Bear this in mind: The larger a state, the more funds required to build an adequate or superior organization. The amount of funds required in each state differs by party (and are set randomly prior to play) and range between \$60,000 and \$150,000.

Local campaigning organizations affect the outcome of your campaigning efforts in several ways. If your organization is less than adequate in a state in which you are campaigning,

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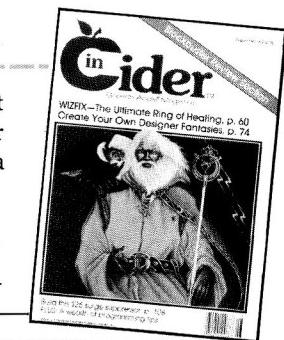


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Listing continued.

two things can happen:

1. Your campaign effectiveness will be lowered—it will be harder to convert undecided voters toward supporting your candidate.
2. After you leave a state, you can actually lose voters committed to your candidate. After all, it takes a local organization to maintain momentum after the candidate leaves the state to campaign elsewhere. Conversely, a superior organization can maintain momentum and make certain that no committed voters defect or change their minds after the candidate leaves the state.

Finally, a fact of politics is that local campaign organizations require constant influxes of money. You should check the adequacy of each state's organization at frequent intervals.

When you are through here, select option 3 (from the submenu) to return to the Main Menu.

As a candidate you'll have to respond to each of the following questions each time you campaign. Your answers will determine how many undecided voters in each state are persuaded to support your candidate. You must decide:

1. In which region should I campaign?
2. In which state(s) within the region should I campaign?
3. What kind of media should I use to promote my message?
4. What kind of message should I communicate?
5. How much should I spend to promote my message?

Here's how campaigning works: When you decide to campaign (Main Menu option 3) the computer will display current status (about 5-7 seconds). When done you'll know:

1. How much money you have in your treasury.
2. The number of days until the election.
3. Status in each region (based upon electoral votes).

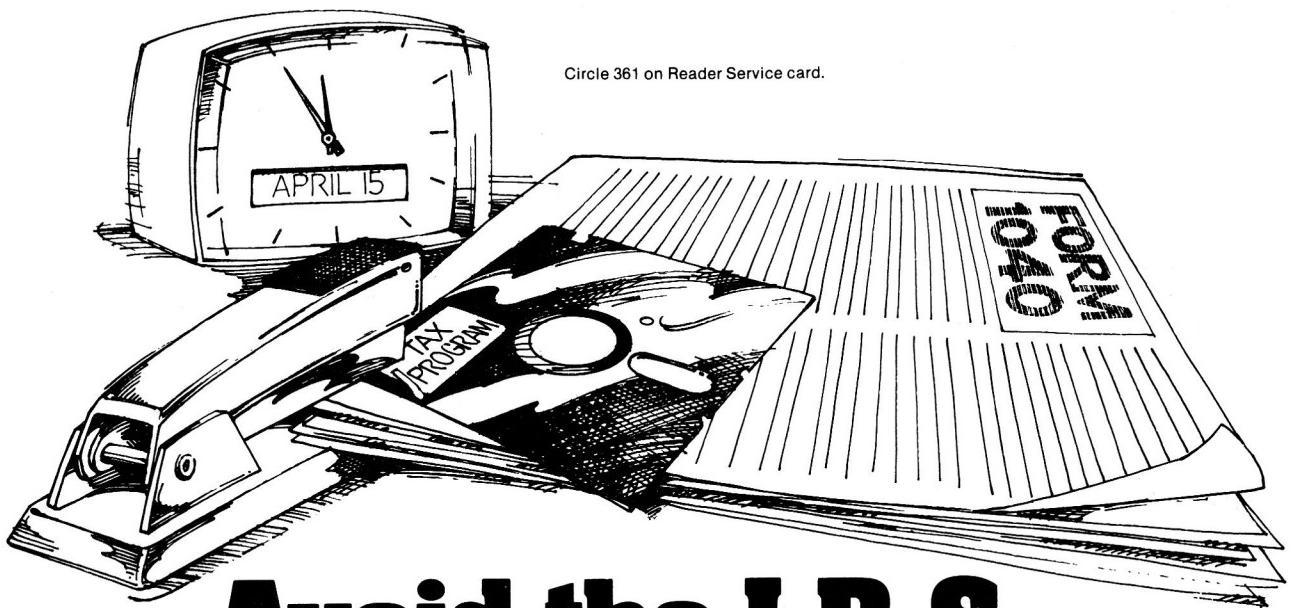
Given this information and your past campaign experience, decide in which region you want to campaign and input your selection. (Note: While you can campaign in only one

```

T": PRINT TAB( 5)"3. CENTRAL ":" PRINT TAB( 5)"4
. EAST": PRINT
550 PRINT "ENTER THE NUMBER OF YOUR CHOICE ... ":" VTAB
(2): HTAB (1): GET ZT$:ZT = VAL (ZT$): IF ZT > 4
OR ZT = 0 THEN GOTO 540
560 IF ZT = 1 THEN SS = 1:ST = 12
570 IF ZT = 2 THEN SS = 13:ST = 29
580 IF ZT = 4 THEN SS = 40:ST = 51
590 IF ZT = 3 THEN SS = 30:ST = 39
600 HOME : PRINT : PRINT "STATE" TAB( 19)"STRENGTH" TAB(
30)"ADEQUACY": PRINT : FOR X = SS TO ST:S = INT
(TT(Y,X) / 1000): IF S < 10 THEN TK = 24
610 IF S > 9 AND S < 100 THEN TK = 23
620 IF S > 99 THEN TK = 22
630 IF S > (MN(Y,X) / 1000) THEN KLS = " "
640 IF S < (1.3 * ((MN(Y,X) / 1000))) THEN KLS = "+"
650 IF S < (MN(Y,X) / 1000) THEN KLS = "-"
660 PRINT X" "NAM$(X) TAB( TK)S TAB( 35)KLS: NEXT X:
POKE 34,21: FOR R = 1 TO 12: PRINT : NEXT R: PRINT
"PRESS (A) TO ADD FUNDS ":" PRINT "PRESS ANY OTHER
R KEY TO EXIT ... ":" GET EX$: IF EX$ < > "A" THEN
HOME : GOTO 490
670 IF JF = 1 THEN GOTO 700
680 HOME : PRINT "TYPE THE NUMBER OF THE STATE": INPUT
"AND PRESS RETURN ... ";SQ: HOME : IF SQ > ST THEN
HOME : GOTO 680
690 IF SQ < SS THEN HOME : GOTO 680
700 HOME : PRINT "ENTER THE AMOUNT AND PRESS RETURN .
. ":" INPUT MQ: IF MQ > AV THEN HOME : FLASH : INVERSE
: PRINT "YOU DONT HAVE THAT MUCH ...": NORMAL : PRINT
ZV$: GET TS:Y$ = " ": GOTO 490
710 AV = AV - MQ: IF JF = 2 THEN GOTO 760
720 IF ZT = 1 OR ZT = 4 THEN TZ = 12
730 IF ZT = 2 THEN TZ = 17
740 IF ZT = 3 THEN TZ = 10
750 FOR X = SS TO ST:TT(Y,X) = TT(Y,X) + (MQ / TZ): NEXT
X: GOTO 770
760 TT(Y,SQ) = TT(Y,SQ) + MQ
770 IF DS = "D" THEN DE = AV
780 IF DS = "R" THEN RE = AV
790 IF JF = 1 THEN GOTO 490
800 HOME : PRINT "ANOTHER STATE IN THIS REGION (Y) OR
(N)": GET Y$: IF Y$ = "Y" THEN HOME : GOTO 680
810 HOME : GOTO 490
820 IF DE < 300000 AND RE < 300000 THEN HOME : HTAB
(10): VTAB (10): FLASH : PRINT "TIME FOR THE RESU
LTS..": FOR X = 1 TO 1000: NEXT X: NORMAL : PRINT
CHR$ (4); "NOMON C,I,O": GOTO 2810
830 IF DE < 300000 AND RE > 300000 THEN HB = 1: GOTO
100
840 GOTO 970
850 MN$ = "DEMOCRATS ":DK = 1:NN$ = "REPUBLICANS":DL =
2: HOME : PRINT : FLASH : HTAB (12): PRINT "SUPPO
RTERS DEFECTING ": FOR CH = 1 TO 999: NEXT : PRINT
:X = RND (1): SPEED= 85: IF X > .7 THEN C5 = 12:
GOTO 880
860 IF X > .4 THEN C5 = 10: GOTO 880
870 C5 = 8
880 SPEED= 255: FOR X = 1 TO C5
890 Z = RND (X): IF Z < .15 OR Z > .4 THEN GOTO 890
900 HOME : AP = RND (X)
910 Y = INT ( RND (1) * 100): IF Y > 51 OR Y < 0 THEN
GOTO 910
920 VTAB (8): PRINT NA$(Y)..."": VTAB (12): FLASH : PRINT
MN$: NORMAL : VTAB (12): HTAB (13): PRINT "LOSE "
: FLASH : VTAB (12): HTAB (18): PRINT INT (Z * 1
00): NORMAL : VTAB (12): HTAB (20): PRINT "% OF S
UPPORTERS ..."
930 IF AP > .5 THEN AP$ = "MOST": GOTO 950
940 AP$ = "FEW"
950 VTAB (14): INVERSE : PRINT AP$: NORMAL : VTAB (14
): HTAB (6): PRINT "SWITCHED TO THE "NN$C = (AP *
Z) * VOTE(DK,Y):VOTE(DK,Y) = INT (VOTE(DK,Y) * (
1 - Z)):VOTE(DL,Y) = INT (VOTE(DL,Y) + C)
960 FOR G7 = 1 TO 1000: NEXT G7: FOR G7 = 1 TO 3: PRINT
CHR$ (7): NEXT G7: NEXT X: RETURN
970 IF SH < .6 THEN RETURN
980 HOME : IF SH > .86 THEN GOTO 1060
985 IF SH > .73 THEN GOTO 1191
990 IF A5 = 1 THEN RETURN
1000 PRINT "QUIET ... I LIKE YOUR STYLE ...": PRINT
: PRINT "I KNOW THAT'S ITS ILLEGAL, BUT ...": PRINT
"I JUST WANT TO SEE YOU WIN!"
1010 PRINT : PRINT "I KNOW THAT YOU CAN USE IT ... ":
PRINT :A4 = INT (( RND (5) * 10) * 100000): IF
A4 < 100000 THEN A4 = 100000

```

Listing continued.



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region per turn, you can campaign in as many states within the region as you desire. Also, should you change your mind and decide not to campaign, select option 5.)

After you select your region, regional status state-by-state then is displayed. This display should be interpreted as follows:

Column 1: This indicates the state's name (followed in parentheses by that state's number of electoral votes).

Column 2: The "Dem Pct." label indicates the percent of decided voters supporting the Democrats (shown only if the Democrats convincingly lead in the state).

Column 3: An asterisk (*) in this column indicates the voter preference among decided voters in that state is too close to call.

Column 4: The "Rep Pct." label indicates the percent of decided voters supporting the Republicans (shown only if the Republicans convincingly lead in the state).

After looking at the state status report, decide which state you want to campaign in, and then input the state number. You'll see a summary of relevant information for the state selected.

You campaign in a state by allocating dollars from your campaign treasury to promote your message. The more dollars you spend, the more potential voters you can reach, and therefore, the higher the number of potential voters which may be converted from being undecided to your party. Decide on the amount of money you want to spend in the state. Input the amount (in thousands, that is—300 equals \$300,000). The minimum amount of funds you must commit each time you campaign in a state is \$200,000.

Next, decide on which kinds of media to spend the money just allocated. Keep in mind that each state is different; some media (or combination of media) will be better choices than others. By clever initial campaigning you should be able to discover the individual media, or media combinations, with the highest effectiveness in each state. Indicate the percent of your total allocation you want to go

for each type of media. When allocating your funds among various media use whole numbers—i.e., 50 means 50 percent. There is no need to enter zeros (for no allocation); just press Return.

Finally, you'll have to decide on your message. Again, some messages may be more effective in some states than others. Decide which message you want and input the corresponding number (no Return is necessary).

After you've made all your decisions, the computer will tell you how effectively, given the current situation, you've just spent your money. Use this information for future planning.

Remember, on a single turn you may campaign in as many states within a region as you like. After you are done campaigning the computer takes its turn.

Deals

Political campaigns are not always run above-board. At various times during the campaign you'll be asked if you want to obtain stolen information or accept illegal campaign contributions. Do what you wish by responding to screen prompts, but remember—while you may gain as a result of these dealings, there can be disastrous results if you are found out. Proceed here with all due caution.

Extraordinary Situations

Also, at various points during the campaign you'll have to respond to extraordinary situations—special attacks waged on you by your opponent. Use your knowledge gained from campaigning to respond. If you have no prior knowledge, take your best guess. In any event, use the feedback to increase the effectiveness of future campaigning.

End of Campaign

Well, that's it. As in the real world, there are many factors which you can control—and there are some surprises along the way, too.

Campaigning ends when one of three events occurs:

1. Both parties are just about out of money (here, the computer ends the

Listing continued.

```

1011 WG$ = STR$(A4): GOSUB 2830
1012 PRINT "HERE'S A CAMPAIGN CONTRIBUTION ... ": PRINT
     : PRINT "TAKE THE $WG$: PRINT : PRINT : PRINT : INPUT
     "DO YOU ACCEPT? (Y) OR (N) ";AD$
1020 IF AD$ = "Y" THEN GOTO 1040
1030 RETURN
1040 DE = DE + A4:A6 = A6 + A4: IF A6 < A7 THEN RETURN

1050 HOME : FLASH : PRINT "NEWS HAS LEAKED OUT!!!!": NORMAL
     : PRINT : PRINT "EVERYONE KNOWS ABOUT YOUR ": PRINT
     "CAMPAIGN CONTRIBUTIONS!!!!": FOR DQ = 1 TO 2500: NEXT
     DQ:A5 = 1: GOSUB 1140: GOSUB 850: RETURN
1060 IF A9 = 1 THEN RETURN
1070 PRINT "DON'T ASK ANY QUESTIONS ... ": PRINT : PRINT
     "NO NAMES EITHER ... ": PRINT "I'VE GOT SOME INFO
     YOU'LL WANT!": PRINT : PRINT : PRINT "DON'T ASK
     ME HOW I GOT IT!": PRINT : PRINT
1080 E1 = INT(100 * RND(1)): IF E1 = 0 OR E1 > 51 THEN
     GOTO 1080
1090 PRINT : PRINT "I CAN TELL YOU ABOUT "NA$(E1): PRINT
     : PRINT TAB(10)"THE BEST MEDIA VEHICLE": PRINT
     TAB(10)"THE MOST EFFECTIVE MESSAGE.": PRINT : PRINT
     : INPUT "INTERESTED? (Y) OR (N) ";DE$
1100 IF DE$ = "Y" THEN HOME : SPEED= 255: GOSUB 1170
     : GOTO 1120
1110 SPEED= 255: RETURN
1120 HOME : F2 = F2 + RND(E1): IF F2 < F3 THEN SPEED=
     255: RETURN
1130 HOME : FLASH : PRINT "WORD ABOUT YOUR STEALING I
     NFO LEAKS OUT!": NORMAL : PRINT : PRINT : NORMAL
     : PRINT "EVERYONE KNOWS ABOUT THE THEFT!!": FOR E
     2 = 1 TO 1500: NEXT E2:A9 = 1
1140 PRINT : PRINT "LOCAL POLITICIANS DESSERT YOU ...
     ": FOR X = 1 TO 51
1150 E4 = RND(X): IF E4 < .33 OR E4 > .66 THEN GOTO
     1150
1160 FEE(1,X) = E4 * FEE(1,X): NEXT X: GOSUB 2710: GOSUB
     850: RETURN
1170 HOME : PRINT "HERE IS YOUR INFORMATION ... ": PRINT
     : PRINT : FOR X = 1 TO 4: IF V(5,E1) = V(X,E1) THEN
     JIS = CS(X)
1180 IF W(5,E1) = W(X,E1) THEN JQS = CS(X + 4)
1190 NEXT X: PRINT "BEST MEDIA -- "JIS: PRINT : PRINT
     "BEST MESSAGE -- "JQS: PRINT : PRINT : INPUT "PRE
     SS ANY KEY & <RETURN> TO GO ON ";DE$
1191 E1 = INT(RND(1) * 100): IF E1 = 0 OR E1 > 51 THEN
     GOTO 1191
1192 HOME : PRINT "THE REPUBLICANS LAUNCH A SPECIAL":
     PRINT "ATTACK IN "NA$(E1): FLASH : PRINT : PRINT
     "AN IMMEDIATE RESPONSE IS NEEDED!!": NORMAL : PRINT
     : PRINT "YOUR OPTIONS ARE: "
1193 PRINT : FOR X = 5 TO 8: PRINT TAB(5)X". "CS(X)
     : NEXT X: PRINT : PRINT : INPUT "HOW DO Y
     OU RESPOND (INPUT CHOICE) - ";CH:CH = CH - 4
1194 IF CH < = 0 OR CH > 4 THEN PRINT CHR$(7): GOTO
     1192
1195 PRINT : PRINT : IF W(CH,E1) = W(5,E1) THEN PRINT
     "EXCELLENT RESPONSE!! - VOTERS RESPOND!!": VO(1,E1)
     ) = VO(1,E1) + ( RND(1) * 1000000): GOTO 1199
1196 IF W(CH,E1) / W(5,E1) > .70 THEN PRINT "AN ACCE
     PTABLE RESPONSE -- ": PRINT "ATTACK IS NEUTRALIZE
     D.": GOTO 1199
1197 PRINT "UNACCEPTABLE RESPONSE!!": PRINT "VOTERS A
     RE UNCONVINCED!!": PRINT "MANY DEFECT TO THE REPUB
     LICANS!!": VO(1,E1) = VO(1,E1) - ( RND(1) * 70000
     0)
1199 FOR CH = 1 TO 2500: NEXT CH: RETURN
1200 NORMAL : HOME : PRINT "YOU HAVE COMMITTED $ "BR:
     PRINT : PRINT "YOU MUST ALLOCATE THIS EXPENDITUR
     E": PRINT "TO VARIOUS MEDIA"
1210 VTAB(6): FOR X = 1 TO 4: PRINT TAB(5)CS(X)" -
     : NEXT X: VTAB(15): PRINT "INPUT PERCENT OF FU
     NDS ALLOCATED TO": PRINT "EACH MEDIA -- PRESS <RT
     N> IF ZERO": PRINT : PRINT
1220 PRINT "IF ALLOCATION DOES NOT ADD TO 100": PRINT
     "THEN FUNDS WILL BE REALLOCATED": PRINT "ON A BAS

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Listing continued.

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Listing continued.

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E OF 100%."
1230 FOR X = 1 TO 4:D(X) = 0: NEXT X: FOR X = 1 TO 4:
    VTAB (X + 5): HTAB (26): INPUT D$(X):D(X) = VAL
    (D$(X)): VTAB (X + 5): HTAB (26): PRINT D(X)"
    ": NEXT X: PRINT : INVERSE : INPUT "PRESS "
    Y' IF OK .";T$: IF T$ < > "Y" THEN 1200
1240 NORMAL :D(6) = 0: FOR X = 1 TO 4:D(6) = D(6) + D
    (X): NEXT X: IF D(6) < = 0 THEN GOTO 1200
1250 IF D(6) = 100 THEN GOTO 1270
1260 FOR X = 1 TO 4:D(X) = (D(X) / D(6)): NEXT X: GOTO
    1280
1270 FOR X = 1 TO 4:D(X) = D(X) / 100: NEXT X
1280 HOME : PRINT "SELECT THE MESSAGE YOUR": PRINT "M
    EDIA WILL COMMUNICATE ...": VTAB (5): PRINT "(SE
    LECT ONE OPTION BELOW)": VTAB (7): FOR VC = 1 TO
    4: PRINT VC" - "C$(VC + 4): NEXT VC
1290 VTAB (22): PRINT "YOUR SELECTION -- ": GET T$:CH
    = VAL (T$): IF CH > 4 OR CH = 0 THEN GOTO 1280

1300 RETURN
1310 HOME : INVERSE : PRINT "EVALUATION OF CAMPAIGN D
    ECISIONS ...": NORMAL : PRINT : PRINT : PRINT "B
    ASED ON THESE PARAMETERS ...": PRINT : IF J1 > 1
    .5 THEN QQS = "EXCELLENT": GOTO 1340
1320 IF J1 > .95 THEN QQS = "ADEQUATE": GOTO 1340
1330 QQS = "INSUFFICIENT"
1340 PRINT TAB( 5)"ORGANIZATIONAL SUPPORT: "QOS: PRINT
    TAB( 5)"LOCAL POLITICAL SUPPORT: "INT ((FEE(1,QT)
    ) / (FEE(1,QT) + FEE(2,QT))) * 100): PRINT :WGS =
    STR$(BR): GOSUB 2830: PRINT TAB( 5)"AMOUNT SPE
    NT IN STATE: $"WGS

1350 PRINT : PRINT "TYPE OF MEDIA MESSAGE: ": PRINT C
    $(CH + 4): PRINT : PRINT "MEDIA ALLOCATION...": PRINT
    : FOR X = 1 TO 4:R(X) = INT (D(X) * 100): NEXT X
    : FOR X = 1 TO 4: PRINT TAB( 5)C$(X)" -- "R(X)"%
    ": NEXT X
1360 VTAB (23):ID = (((((V(5,QT) * BR) * W(5,QT)) * F
    EE(1,QT)) * J1) * PA(QT)):ID = INT (ID)
1370 AC = INT ((FK / ID) * 100): VTAB (23): PRINT "OV
    ERALL EFFECTIVENESS WAS : "AC%"": RETURN
1380 SS = 1:ST = 12:DK = 1:DI = 12: GOSUB 1430:SS = 13
    :ST = 29:DK = 2:DI = 17: GOSUB 1430:SS = 30:ST =
    39:DK = 3:DI = 10: GOSUB 1430:SS = 40:ST = 51:DK =
    4:DI = 12: GOSUB 1430
1390 Z = 0: FOR X = 1 TO 4: IF AZ(X) = 1 THEN GOSUB 1
    480:UU = 0: RETURN
1400 NEXT X: FOR X = 1 TO 4: GOSUB 1420: IF UU > 0 THEN
    Z = UU: GOSUB 1480:UU = 0: RETURN
1410 NEXT X: HOME : VTAB (12): HTAB (14): FLASH : PRINT
    "I PASS ...": NORMAL : FOR X = 1 TO 1000: NEXT : GOTO
    1540
1420 IF (DL(X) / (DL(X) + DG(X))) > .25 THEN UU = X: RETURN
1430 FOR X = SS TO ST: VTAB (21): HTAB (34): PRINT ((
    X * 143) - ELV(X)):EE(DK) = EE(DK) + FEE(2,X): IF
    VOTE(1,X) > VOTE(2,X) THEN DL(DK) = DL(DK) + ELV(
    X): GOTO 1450
1440 DG(DK) = DG(DK) + ELV(X)
1450 NEXT X: IF DL(DK) > DG(DK) THEN AZ(DK) = 1: GOTO
    1470
1460 AZ(DK) = 0
1470 EE(DK) = EE(DK) / DI: RETURN
1480 FOR Y = 4.0 TO 0 STEP -.5: FOR X = 1 TO 4: VTAB
    (21): HTAB (34): PRINT INT (Y * X * EE(X) * 93):
    IF AZ(X) = 1 AND EE(X) > Y THEN Z = X: GOTO 1500

1490 NEXT X: NEXT Y
1500 IF Z = 1 THEN RE$ = "SOUTH":SS = 1:ST = 12:A9$ =
    A9$(Z): RETURN
1510 IF Z = 2 THEN RE$ = "WEST " :SS = 13:ST = 29:A9$ =
    A9$(Z): RETURN
1520 IF Z = 3 THEN RE$ = "CENTRAL":SS = 30:ST = 39:A9
    $ = A9$(2): RETURN
1530 IF Z = 4 THEN RE$ = "EAST":SS = 40:ST = 51:A9$ =
    A9$(Z): RETURN
1540 IF DE > 200000 THEN FL = 2: RETURN
1550 FL = 3: RETURN
1560 HOME : VTAB (1): HTAB (16): FLASH : PRINT "CAMPA
    IGN": NORMAL : PRINT : PRINT :AM = 0: GOSUB 2580
1570 IF D$ = "R" THEN HOME : PRINT "NO..NOT ALLOWED"
    : PRINT : PRINT "THE COMPUTER PLAYS THE REPUBLICA
    NS": FOR X = 1 TO 1500: NEXT X: GOTO 70
1580 IF D$ = "D" OR D$ = "R" THEN GOTO 1600
1590 HOME : GOTO 1560
1600 IF D$ = "D" THEN HB = 1
1610 IF DE = 0 THEN PRINT "NOT ENOUGH REMAINING FUND
    S": FOR X = 1 TO 1000: NEXT X: GOTO 70

```

Listing continued.

campaign automatically).

2. Election day is reached (again, the computer ends the campaign automatically).

3. You decide you want the campaign to end (option 4, Main Menu). After all, you need an option to exercise your ultimate control over the computer.

Seeing the Results

At the end of the campaign, vote totals in each state are saved in a text file ("GAME) and the Results program is loaded and run.

The output from this program is self-explanatory. The order in which state results are presented follow their numeric assignments within regions, making it easier for you to compare your expectations to actual results. Running time for this program is 10–20 minutes, depending upon how close the election is.

How the Programs Work

Understanding how the programs work will help you develop your winning strategies.

As discussed earlier, Set Up creates a new scenario for each playing of Presidential Power. Here, using Apple's random number generator (and a seed number provided by the user) key program parameters are set.

Initial vote count determines the number of supporters for each party prior to the start of formal campaigning. Up to 1 million supporters can be assigned to each party. The number of supporters for each party is represented by variable VO(X,Y) where X represents the party (1 for Democrats, 2 for Republicans) and Y stands for the state number.

Local political support is represented by variable FE(X,Y), which ranges from 0 to 2 and is randomly assigned to each party within a state. Each party's value, divided by the sum of values, represents that party's share of local support. For example, if in state 1 (Alabama) the Democratic level, FE (1,1), is 1.5 and the Republican level, FE (2,1), is .5, then the amount of local support for the Democrats is $1.5/(1.5 + .5)$ or 75 percent.

Also, the *absolute* level of this vari-

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1620 HOME : FLASH : VTAB (1): HTAB (17): FLASH : PRINT
    "STATUS": PRINT : PRINT : NORMAL : GOSUB 2340: PRINT
    : IF DS = "D" THEN AVAIL = DEMBAL:BE = 1:AL = 2
1630 IF DS = "R" THEN AVAIL = REPBAL:BE = 2:AL = 1
1640 IF FL = 1 THEN RETURN
1650 WG$ = STRS (AV): GOSUB 2830: PRINT "$WG$" ARE A
    VAILABLE": PRINT : PRINT ">> TACTICAL STRENGTH":R
    E$ = "":RQ$ = "":RR$ = "":RWS = "": IF SD / (
    SD + SR + SU) > .5 THEN RQ$ = "DEMOCRATS LEAD":S1
    = 1: GOTO 1670
1660 IF SR / (SD + SR + SU) > .5 THEN RQ$ = "REPUBLIC
    ANS LEAD":S1 = 1
1670 IF WD / (WR + WD + WU) > .5 THEN RW$ = "DEMOCRAT
    S LEAD":S2 = 1: GOTO 1690
1680 IF WR / (WD + WR + WU) > .5 THEN RW$ = "REPUBLIC
    ANS LEAD":S2 = 1
1690 IF CD / (CR + CD + CU) > .5 THEN RE$ = "DEMOCRAT
    S LEAD":S3 = 1: GOTO 1710
1700 IF CR / (CD + CR + CU) > .5 THEN RE$ = "REPUBLIC
    ANS LEAD":S3 = 1
1710 IF ED / (ER + ED + EU) > .5 THEN RR$ = "DEMOCRAT
    S LEAD":S4 = 1: GOTO 1730
1720 IF ER / (ED + ER + EU) > .5 THEN RR$ = "REPUBLIC
    ANS LEAD":S4 = 1
1730 GOSUB 2470: PRINT : PRINT ">>> REGION <<<": PRINT
    : VTAB (20): PRINT "DAYS LEFT UNTIL ELECTION : "D
    T: VTAB (7): PRINT "1. SOUTH ----- "RQ$: PRINT "
    2. WEST ----- "RW$: PRINT "3. CENTRAL --- "RE$"
    : PRINT "4. EAST ----- "RR$
1740 PRINT : PRINT "5. NO CAMPAIGN": PRINT : PRINT "P
    RESS THE NUMBER OF THE REGION YOU WANT": VTAB (1)
    : HTAB (20): GET X$:X = VAL (X$): IF X = 0 OR X >
    5 THEN GOTO 1620
1750 ON X GOTO 1760,1770,1780,1790,70
1760 SS = 1:ST = 12:LAB$ = "SOUTH": GOTO 1800
1770 SS = 13:ST = 29:LAB$ = "WEST": GOTO 1800
1780 SS = 30:ST = 39:LAB$ = "CENTRAL": GOTO 1800
1790 SS = 40:ST = 51:LAB$ = "EAST"
1800 HOME : PRINT "STATE (ELV. VOTES)" TAB( 24)"DEM P
    CT" TAB( 34)"REP PCT": PRINT :BRIBE = 0: FOR T =
    SS TO ST:L = 0:G = 0: IF SS < 10 THEN L = 2
1810 IF SS > 9 THEN L = 1
1820 IF VOTE(1,T) > VOTE(2,T) THEN L9 = INT ((VOTE(1
    ,T) / (VOTE(1,T) + VOTE(2,T))) * 100)
1830 IF VOTE(2,T) > VOTE(1,T) THEN G = INT ((VOTE(2,
    T) / (VOTE(1,T) + VOTE(2,T))) * 100)
1840 G1$ = STRS (L9):G2$ = STRS (G):T1 = LEN (G1$):
    T2 = LEN (G2$):T1 = 27 - T1:T2 = 37 - T2: IF L9 =
    0 THEN GOTO 1880
1850 IF G > 0 THEN GOTO 1880
1860 IF L9 < 60 THEN G1$ = "-*-":T1 = 30
1870 L7 = ELV(T): PRINT T TAB( 5)NAM$(T)" ("L7")" TAB(
    T1)G1$: GOTO 1900
1880 IF G < 60 THEN G2$ = "-*-":T2 = 27
1890 L7 = ELV(T): PRINT T TAB( 5)NAM$(T)" ("L7")" TAB(
    T2 + (3))G2$
1900 NEXT T: PRINT "-----"
    -----": POKE 34,21: FOR BNM = 1 TO 10: PRINT : NEXT
    BNM:
1910 INPUT "TYPE STATE NUMBER AND PRESS RETURN .. ";Q
    T$:QT = VAL (QT$): IF QT < SS THEN HOME : GOTO
    1910
1920 IF QT > ST THEN HOME : GOTO 1910
1930 POKE 34,0: HOME
1940 HOME : INVERSE : PRINT NAM$(QT): NORMAL : PRINT
    : PRINT :J1 = TT(BE,QT) / MN(BE,QT):J2 = TT(AL,QT
    ) / MN(BE,QT): IF J1 > 1.5 THEN J1 = 1.5
1950 IF J2 > 1.5 THEN J2 = 1.5
1960 IF J1 > 1.3 THEN QQ$ = "+": GOTO 1990
1970 IF J1 > .99 THEN QQ$ = "OK": GOTO 1990
1980 QQ$ = "": IF J1 = 0 THEN J1 = .01
1990 IF VOTE(1,QT) > VOTE(2,QT) THEN YES = "DEMOCRATS
    CONTROL ":JZ = 1
2000 IF VOTE(2,QT) > VOTE(1,QT) THEN YES = "REPUBLICA
    NS CONTROL ":JZ = 2
2010 ZS = VOTE(1,QT) + VOTE(2,QT):ZQ = VOTE(1,QT):ZW =
    VOTE(2,QT): IF ABS ((ZQ / ZS) - (ZW / ZS)) < .2 THEN
    YES = "TOO CLOSE TO CALL":JZ = 3
2020 IF JZ = 1 THEN YU = INT (VOTE(1,QT) / (VOTE(1,Q
    T) + VOTE(2,QT)) * 100):YZ$ = "%":YU$ = STRS (YU
    )
2030 IF JZ = 2 THEN YU = INT (VOTE(2,QT) / (VOTE(1,Q
    T) + VOTE(2,QT)) * 100):YZ$ = "%":YU$ = STRS (YU
    )
2040 IF JZ = 3 THEN YU$ = "      " :YZ$ = "      "
2050 FLASH : PRINT "STATUS": NORMAL : PRINT YES": "YU
    "

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Listing continued.

able determines how costly it is to reach voters in a state. That is, the higher the FE, the more effective your dollars will be. Thus, it may be more expensive to campaign in one state versus another even if in both states the level of local support is the same. Keep this in mind when developing your campaign strategies.

Values of *media* and *issues* are determined during the Set Up program. Variable *V(X,Y)* represents the effectiveness of particular media (with a range of 0 to 1) where *X* represents the types of media and *Y* represents the state number. Variables *V(5,Y)* and *V(6,Y)* represent the highest and next highest media (in terms of effectiveness) in each state. The procedure is similar for determination of the effectiveness of the campaign message—variable *W(X,Y)*, where *X* is the issue number and *Y* is the state number. Variable *W(5,Y)* is the most effective campaign message within each state.

State names NA\$(Y) and *electoral votes EL(Y)* are input through DATA statements, where *Y* is the state number.

Campaign

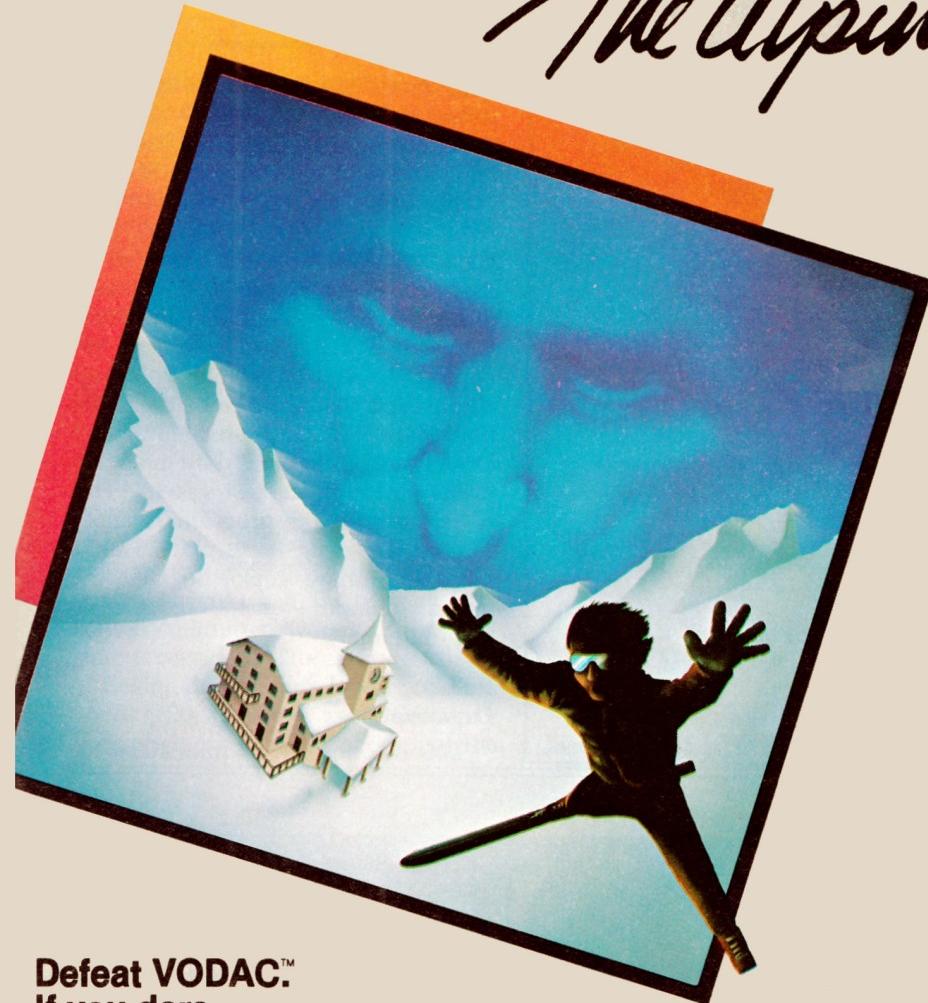
A simulation should meet several criteria. It should contain the key factors which, in the real world, will affect the outcome. It should be minimally affected by chance, provide feedback upon which strategies can be developed and allow multiple paths to "victory." Campaign meets these criteria. Let's see how each aspect of the simulation works.

Fund Raising

Lines 160–430 control fund raising. Success is determined by the amount of popular support (committed voters) behind each party. Specifically, line 370 adds up how many voters are committed to each party. If a party has a national majority, it is guaranteed a return of between 70 and 160 percent on its investment (line 380); if it does not have a majority it will receive a return of between 44 and 133 percent (line 390). Even so, there are internal controls designed to minimize success if a party tries to

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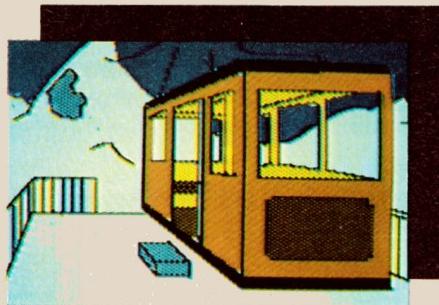
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Listing continued.

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$" "YZ$: PRINT :WG$ = STR$ (AV): GOSUB 2830: PRINT
"FUNDS AVAILABLE: "WG$: PRINT : PRINT "MINIMUM P
ER STATE: $200,000"
2060 PRINT : PRINT "LOCAL POLITICAL SUPPORT: " INT ((FEE(BE,QT) / (FEE(AL,QT) + FEE(BE,QT)) * 100)): PRINT
"ORGANIZATIONAL STRENGTH: "QQ$  

2070 PRINT : PRINT "-----": PRINT
"% OF STATE STILL UNCOMMITTED : " INT (PA(QT) * 1  

00) "%": PRINT : PRINT "FUNDS COMMITTED (IN THOUA  

NDS)": INPUT "--> ";BR:BR = BR * 1000
2080 IF BRIBE > AVAIL THEN VTAB (23): FLASH : PRINT
"You DON'T HAVE ENOUGH MONEY .. ":" NORMAL : FOR X  

= 1 TO 600: NEXT X: GOTO 1940
2090 IF BRIBE < ET THEN VTAB (23): FLASH : PRINT "YO  

U DIDN'T COMMIT ENOUGH FUNDS .... ":" NORMAL : FOR  

X = 1 TO 400: NEXT X: GOTO 1940
2100 AV = AV - BRIBE: GOSUB 1200
2110 IF FL = 1 THEN VOTE(2,QT) = (VOTE(2,QT) + (((((I  

B * BR) * V(5,QT)) + ((IC * BR) * V(6,QT))) * W(5  

,QT)) * FEE(2,QT) * J1 * PA(QT))): GOTO 2130
2120 J = 0:BJ = 0:FJ = 0: FOR FH = 1 TO 4:FJ = FJ + (V  

(FH,QT) * D(FH) * BR): NEXT FH:FJ = FJ * W(CH,QT)  

:FK = (FJ * FEE(1,QT) * J1 * PA(QT)):VOTE(1,QT) =  

VOTE(1,QT) + FK: GOSUB 1310: IF AVAIL = 0 THEN GOTO  

2210
2130 QX = RND (1): IF QX > .1 THEN GOTO 2130
2140 PA(QT) = PA(QT) * (1 - QX): IF FL = 1 AND RE < 20  

0000 THEN FLASH : PRINT "NO MORE FUNDS": FOR LV =  

1 TO 750: NEXT LV: NORMAL : GOTO 3300
2150 IF FL = 1 THEN RETURN
2160 PRINT "IF YOU WISH TO DO BATTLE IN ": PRINT "ANO  

THER STATE PRESS (Y)": PRINT : PRINT "IF YOU WISH  

TO QUIT PRESS ANY KEY... ":" GET CE$: IF CE$ < >  

"Y" THEN GOTO 2200
2170 IF AV < 200000 THEN HOME : PRINT "NOT ENOUGH FU  

NDS LEFT!!": FOR GH = 1 TO 1000: NEXT GH: GOTO 22  

00
2180 IF CE$ < > "Y" THEN GOTO 2200
2190 PART = 0:BRIBE = 0:QFIBE = 0:FJ = 0:JZ = 0: POKE

```

Listing continued.

raise funds too often, too close together in time.

Four programming tricks are used both here and elsewhere in the program. First, the subroutine at line 2830 uses the STR\$, LEFT\$, RIGHT\$, MID\$ and VAL functions (as well as string concatenation) to place commas in large numbers. Second, I made extensive use of the GET statement (as opposed to INPUT), saving time and eliminating the nuisance of the question mark. Third, I used HTAB and VTAB functions to place data in appropriate places on the text screen. (This is best seen in the program Results.) Finally, by using HTAB and VTAB, I hid the flashing cursor so that the screen remains uncluttered while awaiting input.

Building Local Political Organizations

This is controlled by lines 460-810.

Circle 26 on Reader Service card.

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Listing continued.

```

34,0: GOTO 1800
2200 FOR W3 = 1 TO 51:M(W3) = 0: NEXT W3
2210 IF D$ = "D" THEN DEMBAL = AVAIL
2220 IF D$ = "R" THEN REPBAL = AVAIL
2230 POKE 34,0: HOME : VTAB (12): HTAB (14): FLASH : PRINT
"CALCULATING ..": NORMAL
2240 BZ = RND (1): IF BZ > .2 THEN GOTO 2240
2250 FOR X = SS TO ST:J1 = TT(BE,X) / MN(BE,X): IF J1
> .99 THEN GOTO 2290
2260 IF J1 > .7 THEN VOTE(BE,X) = (VOTE(BE,X) * (1 -
BZ)): GOTO 2290
2270 IF J1 > .40 THEN VOTE(BE,X) = (VOTE(BE,X) * (1 -
(1.5 * BZ))): GOTO 2290
2280 VOTE(BE,X) = (VOTE(BE,X) * (1 - (2.5 * BZ)))
2290 NEXT X: FOR X = SS TO ST:Y = 1 - (BZ + .05):TT(B
E,X) = TT(BE,X) * Y: NEXT X:G = RND (X): IF G >
.8 THEN DT = DT - 5: GOTO 2320
2300 IF G > .4 THEN DT = DT - 3: GOTO 2320
2310 DT = DT - 1
2320 IF DT < = 0 THEN HOME : VTAB (12): HTAB (13): FLASH
: PRINT "ELECTION DAY ": NORMAL : FOR DT = 1 TO 1
000: NEXT DT: PRINT : PRINT TAB( 12)"STORING RES
ULTS": GOTO 2810
2330 POKE 34,0: GOTO 70
2340 SD = 0:SR = 0:WR = 0:WD = 0:SU = 0:WU = 0:CR = 0:
CD = 0:ED = 0:ER = 0:EU = 0:CU = 0: FOR X = 1 TO
12: IF (VOTE(1,X) / (VOTE(1,X) + VOTE(2,X)) > .6)
THEN SD = SD + ELV(X): GOTO 2370
2350 IF (VOTE(2,X) / (VOTE(1,X) + VOTE(2,X)) > .6) THEN
SR = SR + ELV(X): GOTO 2370
2360 SU = SU + ELV(X)
2370 NEXT X: FOR X = 13 TO 29: IF (VOTE(1,X) / (VOTE(
1,X) + VOTE(2,X)) > .6) THEN WD = WD + ELV(X): GOTO
2400
2380 IF (VOTE(2,X) / (VOTE(1,X) + VOTE(2,X)) > .6) THEN
WR = WR + ELV(X): GOTO 2400
2390 WU = WU + ELV(X)
2400 NEXT X: FOR X = 30 TO 39: IF (VOTE(1,X) / (VOTE(
1,X) + VOTE(2,X)) > .6) THEN CD = CD + ELV(X): GOTO
2430

```

Listing continued.

Because this function totals, compares and reports data, nothing is especially noteworthy here. Key variables are MN(X,Y) and TT(X,Y), representing the minimum level of dollar commitment required for an adequate organization in each state and each party's actual commitment per state where X represents the party and Y represents the state number.

Actual Campaigning

Campaigning is executed in lines 1560-2330 with subroutines at 1200, 1280, 1300, 2340 and 2830. Here is how it works.

State status is calculated in the subroutine at line 2340. If neither party controls more than 60 percent of a state's committed voters, then that state is considered "too close to call."

Regional status is calculated in lines 1660-1720. If neither party decisively controls more than 60 percent of the

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Listing continued.

```

2410 IF (VOTE(2,X) / (VOTE(1,X) + VOTE(2,X)) > .6) THEN
2420   CR = CR + ELV(X): GOTO 2430
2430   CU = CU + ELV(X)
2430   NEXT X: FOR X = 40 TO 51: IF (VOTE(1,X) / (VOTE(
1,X) + VOTE(2,X)) > .6) THEN ED = ED + ELV(X): GOTO
2460
2440   IF (VOTE(2,X) / (VOTE(1,X) + VOTE(2,X)) > .6) THEN
ER = ER + ELV(X): GOTO 2460
2450 EU = EU + ELV(X)
2460 NEXT X: RETURN
2470 IF RES = " " THEN RES = FFS
2480 IF RQ$ = " " THEN RQ$ = FF$
2490 IF RR$ = " " THEN RR$ = FF$
2500 IF RW$ = " " THEN RW$ = FF$
2510 RETURN
2520 IF LD > 8 AND CT = 3 THEN OV = 1: RETURN
2530 IF LD > 5 AND CT = 4 THEN OV = 1: RETURN
2540 IF LD > 2 AND CT = 5 THEN OV = 1: RETURN
2550 IF LD > 1 AND CT = 6 THEN OV = 1: RETURN
2560 IF CT = 7 THEN OV = 1: RETURN
2570 RETURN
2580 PRINT "ARE YOU A (R)EPUBLICAN": PRINT "OR A
(D)EMOCRAT": PRINT : PRINT "PRESS (R) OR (D)": VTAB
(1): HTAB (20): GET D$: RETURN
2590 IF A5 = 1 OR A9 = 1 THEN RETURN
2600 HOME : TYH = RND (1): P3 = SHAN: PRINT "": FOR X =
1 TO 100: NEXT X: PRINT "": HOME : FLASH : VTAB (
10): HTAB (02): PRINT "LOCAL POLITICAL SUPPORT HA
S SHIFTED!!": NORMAL
2610 R = RND (X): IF R < .5 THEN GOTO 2610
2620 PRINT : PRINT : PRINT : FLASH : VTAB (15): HTAB
(13): PRINT "RECALCULATING": NORMAL : FOR X = 1 TO
51: TJ = FEE(1,X): TK = FEE(2,X): TL = VOTE(1,X): TM =
VOTE(2,X): IF TL > TM AND TK > TJ THEN FEE(1,X) =
(TJ * (.8 + RND (X))): GOTO 2700
2630 IF TM > TL AND TJ > TK THEN FEE(2,X) = (TK * (.8
+ RND (X))): GOTO 2700
2640 TN = RND (X): IF TN > .25 THEN GOTO 2640
2650 IF TL > TM THEN FEE(1,X) = FEE(1,X) + TN
2660 IF TM > TL THEN FEE(2,X) = FEE(2,X) + TN
2670 IF FEE(1,X) < = 2 AND FEE(2,X) < = 2 THEN GOTO
2700
2680 IF FEE(1,X) > 2 THEN TF = FEE(1,X): TZ = 2 / TF: F
EE(1,X) = FEE(1,X) * TZ: FEE(2,X) = FEE(2,X) * TZ
2690 IF FEE(2,X) > 2 THEN TF = FEE(2,X): TZ = 2 / TF: F
EE(1,X) = FEE(1,X) * TZ: FEE(2,X) = FEE(2,X) * TZ
2700 NEXT X
2710 HOME : PRINT TAB( 4)"LOCAL POLITICAL SUPPORT, B
Y REGION": PRINT TAB( 4)-----
-----: PRINT "REGION" TAB( 15)"DEMOCRATS" TAB(
25)"REPUBLICANS": POKE 34,3: PRINT : PRINT "SOUTH
": PRINT : SS = 1: ST = 12
2720 FOR X = SS TO ST: UQ = FEE(1,X): UK = FEE(2,X): H2 =
INT (((UQ / (UQ + UK)) * 100)): IF H2 > = 100 THEN
H2 = 99
2730 H1 = (100 - H2): AB = 17: IF (H1 + H2) = 100 THEN
GOTO 2740
2731 IF (H1 + H2) < 100 THEN H3 = 100 - (H1 + H2): GOTO
2733
2732 GOTO 2736
2733 IF H1 > H2 THEN H2 = H2 + H3
2734 IF H2 > H1 THEN H1 = H1 + H3
2735 GOTO 2740
2736 H3 = (H1 + H2) - 100
2737 IF H1 > H2 THEN H1 = H1 - H3
2738 IF H2 > H1 THEN H2 = H2 - H3
2740 IF H2 < 10 THEN AB = 18
2745 AC = 28: IF H1 < 10 THEN AC = 29
2750 PRINT NAM$(X) TAB( AB)H2 TAB( AC)H1: NEXT X: VTAB
(23): PRINT ZVS: GET TS: JH = JH + 1: IF JH = 1 THEN
SS = 13: ST = 29: HOME : PRINT : PRINT "WEST": PRINT
: GOTO 2720
2760 IF JH = 2 THEN SS = 30: ST = 39: HOME : PRINT : PRINT
"CENTRAL": PRINT : GOTO 2720
2770 IF JH = 3 THEN SS = 40: ST = 51: HOME : PRINT : PRINT
"EAST": PRINT : GOTO 2720
2780 IF JH = 4 THEN JH = 0
2790 POKE 34,0: RETURN : IF GG = 1 THEN RETURN
2800 GOTO 70
2810 HIS = "GAME": HOME : HTAB (12): VTAB (17): PRINT
"STORING RESULTS": FOR X = 1 TO 51: VOTE(1,X) =
INT (VOTE(1,X)): VOTE(2,X) = INT (VOTE(2,X)): NEXT X:
PRINT CHR$ (4); "OPEN "; HIS: PRINT CHR$ (4); "NO
MONC,I,O"
2820 PRINT CHR$ (4); "WRITE "; HIS: FOR X = 1 TO 51: PRINT
VOTE(1,X): PRINT VOTE(2,X): PRINT ELV(X): PRINT N
AMS(X): NEXT X: PRINT CHR$ (4); "CLOSE "; HIS: PRINT
CHR$ (4); "RUN RESULTS"

```

Listing continued.

electoral votes in a region, that region is labeled "too close to call."

Media selections are controlled in the subroutine beginning at line 1200. Of special note are lines 1240-1270 which make certain appropriations add up to 100 percent. Message selection is controlled by the subroutine at line 1280.

"The subroutine at 1300 compares the number of voters actually persuaded to the number of voters which could have been persuaded under ideal conditions."

Voters persuaded are a function of dollars spent and decisions made. The formulae which calculate the number of voters persuaded (for the Democrats) reside in line 2120. These formulae work as follows:

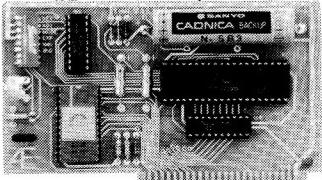
1. The initial dollar amount committed to a state is reduced to reflect the effectiveness of media selected and the apportionment of funds among the various media options.
2. This figure (variable FJ) is multiplied by the effectiveness of the message selected.
3. This figure is then multiplied by local political support (FE), adequacy of local organizations (J1) and percent of voters still undecided (PA). This final figure (FK) represents the number of voters persuaded.
4. The number of voters persuaded is added to the current total, variable VO(X,Y).

The subroutine at 1300 compares the number of voters actually persuaded to the number of voters which could have been persuaded under ideal conditions (given current level of adequacy of local organizations, local political support and percent of voters still undecided). This comparison is reported as a percent (actual/ideal) and is the Effectiveness Score.

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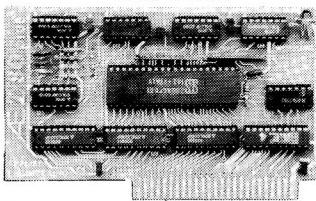
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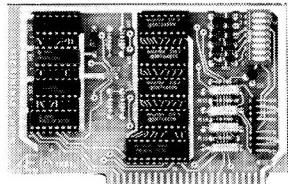
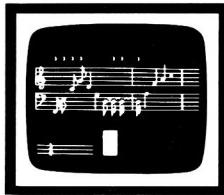


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SUPERTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTER	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

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Listing continued.

```

2830 T = LEN (WG$): IF LEFT$ (WG$,1) = "-" THEN T =
T - 1:WG$ = RIGHTS (WG$,T):SS = "-"
2840 ON T GOTO 2850,2850,2850,2860,2870,2880,2890,290
0
2850 WG$ = WG$: GOTO 2910
2860 WG$ = LEFT$ (WG$,1) + "," + RIGHT$ (WG$,3): GOTO
2910
2870 WG$ = LEFT$ (WG$,2) + "," + RIGHT$ (WG$,3): GOTO
2910
2880 WG$ = LEFT$ (WG$,3) + "," + RIGHT$ (WG$,3): GOTO
2910
2890 WG$ = LEFT$ (WG$,1) + "," + MID$ (WG$,2,3) + ","
" + RIGHT$ (WG$,3): GOTO 2910
2900 WG$ = LEFT$ (WG$,2) + "," + MID$ (WG$,3,3) + ","
" + RIGHT$ (WG$,3)
2910 WG$ = SS + WG$:SS = "": RETURN
2920 IF RE < 3000000 THEN HOME :HB = 0: VTAB (12): HTAB
(9): PRINT "COMPUTER HAS NO FUNDS": FOR X = 1 TO
1000: NEXT X: GOTO 70
2930 FL = 1:X = RND (1):V8 = 0: VTAB (21): HTAB (5): PRINT
"ANALYZING STRATEGIC AREAS": GOSUB 1380: IF FL =
2 THEN FL = 0: GOTO 70
2940 IF FL = 3 THEN FL = 0: PRINT : PRINT "DEMOCRATS
OUT OF MONEY ...": PRINT : PRINT "CAMPAIGN CEASES
...": FOR GH = 1 TO 2000: NEXT GH: GOTO 2810
2950 IF RE < 3000000 THEN GOTO 3050
2960 IF RV > 5 THEN GOTO 3050
2970 WE = RND (1): IF WE < .75 THEN GOTO 3050
2980 HOME : SPEED= 100: VTAB (12): HTAB (4): PRINT "F
IRST, I WILL RAISE FUNDS ...": SPEED= 255: FOR
Z = 1 TO 1000: NEXT :RV = RV + 1:X = RND (1):AVA
IL = RE:D$ = "R"
2990 FOR CC = 1 TO 51:CM(1) = CM(1) + VOTE(1,CC):CM(2)
) = CM(2) + VOTE(2,CC): NEXT CC:CD = CM(2) / (CM(
1) + CM(2)): IF CD > .5 THEN R = .35 + CD:IN = INT
(R * 3000000): GOTO 3010
3000 IN = INT (CD * 3000000)
3010 IF IN < 1000000 THEN IN = 1000000
3020 Y$ = STR$ (INVEST):VB = 15: HOME : PRINT "HOW MA
NY DOLLARS WILL YOU COMMIT?": PRINT : PRINT "ENTE
R THE AMOUNT IN THE BOX BELOW...": VTAB (15): HTAB
(16): INVERSE : PRINT "": VTAB (15): HTAB
(16)
3030 FOR X = 1 TO 1500: NEXT X: SPEED= 2: VTAB (15): HTAB
(16)
3040 PRINT LEFT$ (Y$,1): VTAB (15): HTAB (17): PRINT
",": VTAB (15): HTAB (18): PRINT MID$ (Y$,2,3): VTAB
(15): HTAB (21): PRINT ",": VTAB (15): HTAB (22):
PRINT RIGHT$ (Y$,3): SPEED= 255: FOR Z = 1 TO 1
000: NEXT
3041 GOSUB 370:CM(1) = 0:CM(2) = 0
3050 VTAB (23): HTAB (1): PRINT "STRATEGIC PLANNING P
ARAMETERS: "
3060 NL = LEN (A9$): FOR X = 1 TO (NL - 1) STEP 2:A8$
= MID$ (A9$,X,2):A8 = VAL (A8$): VTAB (23): HTAB
(34): PRINT MID$ (A9$,X,4): IF VOTE(1,A8) > VOTE
(2,A8) THEN P6(A8) = 1:CT = CT + 1: GOSUB 2520
3070 IF OV = 1 THEN OV = 0: GOTO 3090
3080 NEXT X
3090 CT = 0: HOME : SPEED= 100: VTAB (12): HTAB (9): PRINT
"THE AREA I WISH TO ": VTAB (13): HTAB (10): PRINT
"CAMPAIGN IN IS: "RE$: FOR X = 1 TO 1000: NEXT : SPEED= 255
3100 HOME : INVERSE : SPEED= 255: PRINT "HERE ARE MY
ACTIONS ... ": FOR X = 1 TO 1000: NEXT : NORMAL :
PRINT : PRINT "BUILD CAMPAIGN ORGANIZATIONS IN..
": PRINT : SPEED= 255: FOR X = SS TO ST: IF TT(2,
X) = > MN(2,X) THEN GOTO 3130
3110 V9 = MN(2,X) - TT(2,X): IF P6(X) = 1 THEN V9 = V9
* 1.10
3120 TT(2,X) = TT(2,X) + V9:RE = RE - V9: VTAB (5): HTAB
(15): PRINT "": VTAB (5)
: HTAB (15): PRINT NA$(X)
3130 IF REPBAL < = 0 THEN REPBAL = 0:FL = 0: HOME : VTAB
(12): HTAB (6): PRINT "NO MORE FUNDS AVAILABLE ..
..": FOR X = 1 TO 1500: NEXT : GOTO 70
3140 NEXT X: PRINT : PRINT : PRINT "CAMPAIGN
IN ...": SPEED= 255:FL = 1:D$ = "R":AVAIL = REPBA
L:BE = 2:AL = 1: FOR X = SS TO ST:J1 = TT(2,X) /
MN(2,X): IF J1 > 1.5 THEN J1 = 1.5
3150 IF P6(X) < > 1 THEN GOTO 3320
3160 XY = RND (1):PH = VOTE(1,X) - VOTE(2,X):QT = X: IF
LD > 8 THEN IB = .75:IC = .25: GOTO 3210
3170 IF LD > 6 THEN IB = .82:IC = .18: GOTO 3210
3180 IF LD > 4 THEN IB = .90:IC = .10: GOTO 3210
3190 IF LD > 2 THEN IB = .95:IC = .05: GOTO 3210
3200 IB = 1:IC = 0

```

Listing continued.

Adjustments to Program Parameters

At the end of campaigning in a state, the number of undecided voters is reduced. Also:

1. Local political organizations spend money to support the campaign effort. As a result, their balances are lowered and their adequacy may be reduced to below acceptable levels. This occurs in line 2290.

2. Vote totals are altered to reflect the strength of local campaign organizations (lines 2250-2280). As you can see, a large percentage of voters in a state can be lost if the local organization's balance is less than the minimum required.

Local Political Support

Changes in local political support occur at random intervals, and are controlled by the subroutine beginning at line 2600. Here is how this works. First, for each state, the Apple checks which party is currently leading in votes (in a state) and who has the greater share of local political support. A party which is now leading in a state but did *not* have the majority of local political support is considered to have momentum (after all, it overcame weak local political support to persuade a majority of committed voters). Local support is adjusted accordingly. If this is not the case, local support undergoes minor adjustments.

Deals and Illegal Contributions

Shady deals are controlled in the subroutine at line 1000. Campaign contributions accepted are added to the Democratic treasury (variable DE) and to the running total of bribes accepted. When this running total exceeds the danger point (variable A7, randomly set in line 10 at the start of play), bribes "hit the light of day."

Similarly, each time illicit information is accepted, a random number between 0 and 1 is added to a running total. When this total exceeds its danger point (variable F3, set randomly in line 10 at the start of play) this activity becomes exposed.

When either of the above events happens, supporters desert the candidate (the subroutine at line 820) and

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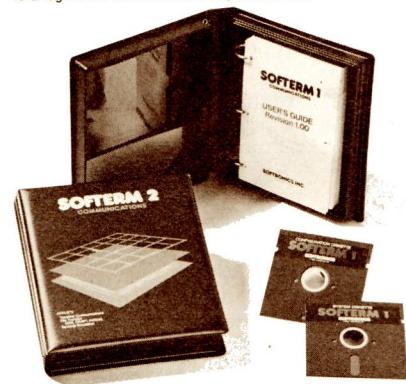
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SOFTRONICS

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Listing continued.

```

3210 FOR Z = ET TO 5000000 STEP 30000: SPEED= 255:BT =
    (((((IB * Z) * V(5,QT)) + ((IC * Z) * V(6,QT)))
     * W(5,QT)) * FEE(2,QT)) * J1) * PA(QT)): IF BT >
    PH THEN GOTO 3230
3220 NEXT Z
3230 IF XY > = .33 THEN BR = (Z * (1 + (LD / 25))): GOTO
    3250
3240 BR = (Z * (1 - (LD / 25)))
3250 IF AV < = 0 THEN RE = 0: GOTO 3130
3251 IF BR > 750000 AND EL(X) < 10 THEN BR = ET: GOTO
    3290
3260 IF BR > 1500000 AND EL(X) < 20 THEN BR = ET: GOTO
    3290
3270 IF BR < ET THEN BR = ET
3280 IF BR > AV THEN BR = AV
3285 IF RE < = 0 THEN GOTO 3130
3290 SPEED= 255: PRINT TAB(15)NAM$(X):AV = AV - BR:
    PB = 0:QF = 0:JZ = 0: GOSUB 2110:BR = 0: NEXT X:U
    U = 0: IF AV < = 0 THEN AV = 0:RE = 0: GOTO 3130
3300 FOR X = SS TO ST:P6(X) = 0: NEXT X:Z1 = 0:Z2 = 0
    :Z3 = 0:Z4 = 0:Z5 = 0:Z6 = 0:Z7 = 0:Z8 = 0: FOR X
    = 1 TO 999: NEXT X:FL = 0:RE = INT (AV): FOR X =
    1 TO 4:DL(X) = 0:DK = 0:DJ = 0:EE(X) = 0:DG(X) =
    0:AZ(X) = 0: NEXT X:FL = 0
3310 WG$ = STR$(RE): GOSUB 2830: VTAB (23): PRINT "F
    UNDS LEFT: $ "WG$: FOR Y = 1 TO 1200: NEXT Y: GOTO
    2210
3320 BR = 0: NEXT X:V8 = 0:FL = 0: GOTO 3300
3330 HOME : HTAB (13): INVERSE : PRINT "CURRENT STATU
    S": PRINT : PRINT : PRINT
3340 NORMAL : PRINT "FUNDS AVAILABLE": PRINT "-----
    -----": PRINT
3350 WG$ = STR$(DE): GOSUB 2830: PRINT TAB(5)"DEMO
    CRATS : $ "WG$:WG$ = STR$(RE): GOSUB 2830: PRINT
    TAB(5)"REPUBLICANS: $ "WGS
3360 PRINT : PRINT : PRINT "ELECTORAL STATUS": PRINT
    "-----": PRINT
3365 XX = 0:XY = 0:XZ = 0
3370 FOR X = 1 TO 51: IF VO(1,X) / (VO(1,X) + VO(2,X)
    ) > .6 THEN XX = XX + EL(X): GOTO 3400
3380 IF VO(2,X) / (VO(1,X) + VO(2,X)) > .6 THEN XY =
    XY + EL(X): GOTO 3400
3390 XZ = XZ + EL(X)
3400 NEXT X
3410 PRINT TAB(5)"LEANING TO DEMOCRATS : "XX
3420 PRINT TAB(5)"LEANING TO REPUBLICANS: "XY
3430 PRINT TAB(5)"TOO CLOSE TO CALL: "XZ
3440 PRINT : PRINT : PRINT "DAYS LEFT TO ELECTION : "
    DT: VTAB (23): PRINT "PRESS ANY KEY FOR MAIN MENU
    ..."; GET DE$  

3450 RETURN

```

Listing 3. Presidential Power Results.

```

10 DIM WC(4,11),WI(51),P6(51),KY(51),M(51),FEE(2,51),
    VOTE(2,51),A(11),AS(11),PO(22),NAM$(51),ELV(51),P
    A(51),MN(2,51),TT(2,51),C(22): DIM K(51):HI$ = ^
    GAME": PRINT CHR$(4);"OPEN ";HI$: PRINT CHR$(4);
    "READ ";HI$  

20 FOR X = 1 TO 51: INPUT VOTE(1,X): INPUT VOTE(2,X):
    INPUT ELV(X): INPUT NA$(X): NEXT X: PRINT CHR4(4
    );"CLOSE ";HI$: FOR Z = 1 TO 39:A$ = A$ + " ": NEXT
    Z: HOME : FOR S = 1 TO 51
30 VTAB (1): FLASH : PRINT NA$(S): NORMAL : VTAB (1):
    HTAB (20): PRINT EL(S)" ELECTORAL VOTES": PRINT
    : PRINT "TOTAL VOTES CAST: ": PRINT "ESTIMATED %
    OF TOTAL: ": PRINT : INVERSE : VTAB (6)
40 HTAB (4): PRINT "PARTY": HTAB (20): VTAB (6): PRINT
    "VOTES": HTAB (30): VTAB (6): PRINT "% OF VOTES":
    NORMAL : PRINT : PRINT "DEMOCRATS": PRINT "REPUB
    LICANS"
50 HTAB (1): VTAB (13): PRINT "-----
    -----": PRINT TAB(24)"VOTING": PRINT
    TAB(20)"----- STATES": PRINT TAB(20)"TOTAL" TAB(31)"%" TAB(35)"WON": NORMAL : PRINT
    "DEMOCRATS": PRINT "REPUBLICANS"

```

Listing continued.

local politicians reevaluate their support.

Your Opponent—The Apple

The Apple is a crafty opponent. Decision-making is controlled by the subroutine at line 2920 and operates as follows.

First, it decides if it should raise funds. If so, it follows the procedures for fund raising—if not (or afterwards), it moves on to selecting a region and states in which to campaign.

Selection of a region occurs in the subroutine beginning at line 1380. A two-step decision-making process is used. First, it finds the region(s) in which the opposition is leading in electoral votes. Second, from among the regions identified, it finds the one region in which it has the highest average level of local political support. If the Republicans (e.g., the computer) lead in all four regions, it will decide either to pass or to pick one region to campaign in anyway.

After a region is selected, the computer selects the states within the region in which it will campaign. States are examined in the order of decreasing electoral votes, and each state in which the computer is *not* leading is tagged a “1” in variable P6(X), where X represents the state number. The maximum number of states which can be selected is controlled by the “level of difficulty” and is monitored by the subroutine at line 2520.

Next, the local organizational strength in each state in the region is checked, and adjusted if necessary.

Campaigning in each selected state follows. The computer already knows the two best media vehicles and most effective message for each state. But, the “level of difficulty” determines how funds committed will be allocated among the two best media types. Lines 3160–3200 control this. As you can see, as the level of difficulty increases, the percent of funds allocated to the best media vehicle also increases.

Given these parameters, the loop between lines 3200 and 3220 calculates the minimal amount of funds required to persuade enough voters to insure that the Republicans will have committed to them at least 51 percent



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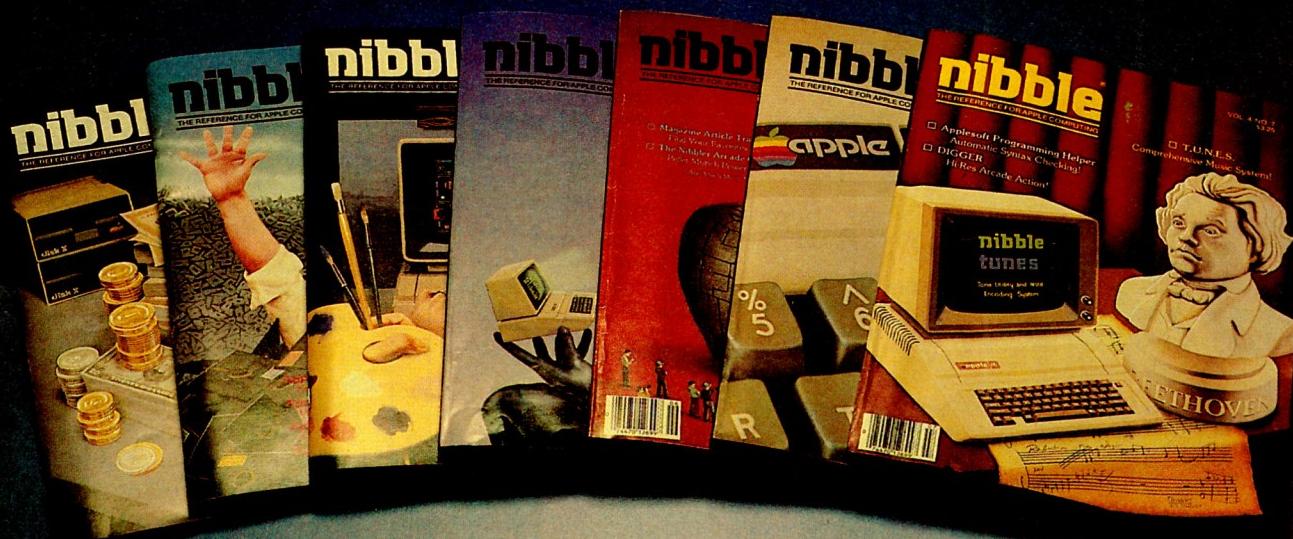
```

60 INVERSE : HTAB (20): VTAB (21): PRINT "TTL ELEC VT
S": HTAB (36): VTAB (21): PRINT "PCT": NORMAL : PRINT
"DEMOCRATS": PRINT "REPUBLICANS":A = VOTE(1,S):B =
VOTE(2,S): IF K(S) = 1 THEN CT = 6:AD = 0:K(S) =
0: GOTO 100
70 B1 = (A / (A + B)): IF B1 > .75 OR B1 < .25 THEN CT
= 2: GOTO 100
80 IF B1 > .59 OR B1 < .41 THEN CT = 3: GOTO 100
90 CT = 4:AD = 1: IF EL(S) < 8 THEN CT = 5:AD = 0
100 EA = RND (S): IF EA > .25 THEN GOTO 100
110 TX = (1 + EA) * (A + B): FOR Y = 1 TO CT: SPEED= 1
40
120 C = RND (S): IF C > .2 THEN GOTO 120
130 IF AD = 1 THEN D = RND (S): IF D > .25 THEN GOTO
130
140 IF AD = 1 THEN GOTO 160
150 D = RND (S): IF D > .53 + (Y / 8) THEN GOTO 150
160 E = E + C: IF E > .8 THEN E = .8 + (Y / 50)
170 F = F + D: IF F > .8 THEN F = .8 + (Y / 30)
180 G = INT (A * E):WG$ = STR$ (G): GOSUB 500:H$ = W
G$:I = INT (B * F):WG$ = STR$ (I):R = G + I:: GOSUB
500:J$ = WG$:K = INT ((G / R) * 100):L = 100 - K
: IF L = 100 THEN L = 99:K = 1
190 VTAB (3): HTAB (20):WG$ = STR$ (R): GOSUB 500:R$ =
WG$: PRINT R$: VTAB (4): HTAB (24): IF FL < >
1 THEN PRINT INT ((R / TX) * 100)
200 VTAB (8): HTAB (27 - LEN (H$)): PRINT H$: VTAB (
9): HTAB (27 - LEN (J$)): PRINT J$:T = 33: IF K <
10 THEN T = 34
210 VTAB (8): HTAB (T): PRINT K:T = 33: IF L < 10 THEN
T = 34
220 VTAB (9): HTAB (T): PRINT L: IF FL = 1 THEN FL =
0: GOTO 260
230 FOR Z = 1 TO 300: NEXT Z: IF HG = 1 THEN GOTO 26
0
240 NEXT Y: IF AD = 1 THEN GOTO 460
250 E = 1:F = 1:FL = 1: VTAB (4): PRINT A$: VTAB (12):
PRINT "100% OF ALL VOTES HAVE BEEN COUNTED": NORMAL
:K(S) = 0:TQ = TQ + 1:TW = TW + EL(S):HG = 1: GOTO
180
260 SPEED= 255:E = 0:F = 0:HG = 0: IF A > B THEN D$ =
"DEMOCRATS":HH = 11:S(1) = S(1) + 1:S(3) = S(3) +
EL(S): GOTO 280
270 D$ = "REPUBLICANS":HH = 13:S(2) = S(2) + 1:S(4) =
S(4) + EL(S)
280 FOR Z = 1 TO 400: NEXT Z: VTAB (12): SPEED= 255: PRINT
A$: VTAB (11): FLASH : PRINT D$: NORMAL : VTAB (1
1): HTAB (HH): PRINT "WIN IN "NA$(S)" --": PRINT
"THEY RECEIVE AN ADDITIONAL ": INVERSE
290 VTAB (12): HTAB (29): PRINT EL(S): NORMAL : VTAB
(12): HTAB (32): PRINT "VOTES": FOR Z = 1 TO 2500
: NEXT Z: SPEED= 255: VTAB (1): FOR Z = 1 TO 12: PRINT
A$: NEXT Z: VTAB (6): HTAB (10): PRINT "UPDATING
TOTALS ... "
300 VTAB (12): PRINT "STATES LEFT: ": VTAB (12): HTAB
(14): INVERSE : PRINT (51 - TQ): NORMAL : VTAB (1
2): HTAB (20): PRINT "ELV. VTS. LEFT: ": INVERSE
: HTAB (36): VTAB (12): PRINT (538 - TW): NORMAL
: SPEED= 100
310 M = M + A:N = N + B:WG$ = STR$ (M): GOSUB 500:M$ =
WG$:WG$ = STR$ (N): GOSUB 500:N$ = WG$:U = INT
((M / (M + N)) * 100):P = 100 - U:Q = INT ((S(3) /
538) * 100):R = 100 - Q
320 VTAB (17): HTAB (27 - LEN (M$)): PRINT M$: VTAB
(18): HTAB (27 - LEN (N$)): PRINT N$:T = 31: IF
U < 10 THEN T = 32
330 VTAB (17): HTAB (T): PRINT U:T = 31: IF P < 10 THEN
T = 32

```

Listing continued.

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```

340 VTAB (18): HTAB (T): PRINT P:T = 36: IF S(1) < 10
    THEN T = 37
350 VTAB (17): HTAB (T): PRINT S(1):T = 36: IF S(2) <
    10 THEN T = 37
360 VTAB (18): HTAB (T): PRINT S(2): IF S(3) > = 100
    THEN T = 24: GOTO 380
370 T = 25: IF S(3) < 10 THEN T = 26
380 VTAB (22): HTAB (T): PRINT S(3):T = 25: IF S(4) <
    10 THEN T = 26
390 IF S(4) > = 100 THEN T = 24: GOTO 410
400 T = 25: IF S(4) < 10 THEN T = 26
410 VTAB (23): HTAB (T): PRINT S(4):T = 36:C1 = INT
    ((S(3) / 538) * 100):C2 = INT ((S(4) / 538) * 10
    0): IF C1 < 10 THEN T = 37
420 VTAB (22): HTAB (T): PRINT C1:T = 36: VTAB (23): IF
    C2 < 10 THEN T = 37
430 HTAB (T): PRINT C2: SPEED= 255: VTAB (12): PRINT
    A$ 
440 SPEED= 255: VTAB (6): PRINT A$: VTAB (8): PRINT A
    $: IF AE = 1 THEN RETURN
450 NEXT S:R1 = LEN (C8$): FOR Z1 = 1 TO R1 STEP 2:S
    $ = MID$ (C8$,Z1,2):CT = 5:S = VAL (S$):AE = 1:
    GOSUB 30: GOTO 490
460 SPEED= 255: VTAB (1): FOR Z = 1 TO 12: PRINT A$: NEXT
    Z: VTAB (6): PRINT "VOTE IS TOO CLOSE TO REPORT V
    ICTOR ..": PRINT : PRINT "WILL RETURN LATER FOR V
    OTE UPDATE ..."
470 FOR Z = 1 TO 1500: NEXT Z:C7$ = STR$ (S): IF LEN
    (C7$) = 1 THEN C7$ = "0" + C7$
480 C8$ = C8$ + C7$:AD = 0:K(S) = 1: GOTO 440
490 NEXT Z1: END
500 IF LEFT$ (WG$,1) = "-" THEN K$ = "-":Q = LEN (W
    G$):Q = Q - 1:WG$ = MID$ (WG$,2,Q)
510 T = LEN (WG$): ON T GOTO 520,530,540,550,560,570,
    580,590
520 WG$ = WG$: GOTO 600
530 WG$ = WG$: GOTO 600
540 WG$ = WG$: GOTO 600
550 WG$ = LEFT$ (WG$,1) + "," + RIGHTS$ (WG$,3): GOTO
    600
560 WG$ = LEFT$ (WG$,2) + "," + RIGHTS$ (WG$,3): GOTO
    600
570 WG$ = LEFT$ (WG$,3) + "," + RIGHTS$ (WG$,3): GOTO
    600
580 WG$ = LEFT$ (WG$,1) + "," + MID$ (WG$,2,3) + ","
    + RIGHTS$ (WG$,3): GOTO 600
590 WG$ = LEFT$ (WG$,2) + "," + MID$ (WG$,3,3) + ","
    + RIGHTS$ (WG$,3)
600 WG$ = K$ + WG$:K$ = " ": RETURN

```

of all committed voters in that state. When this amount is reached the computer exits the loop and performs these checks: (1) if the amount is less than \$200,000, the amount committed is raised to that level, (2) if the amount needed is too high (given the state's number of electoral votes), the amount is adjusted downward, and (3) if the state has a large number of electoral votes, additional funds are committed.

Finally, the accuracy of this estimate (and the resulting amount committed) is adjusted to reflect the "level of difficulty." Chance determines if the actual amount of funds committed is over or under the estimated amount needed.

The formula in the subroutine at line 2110 adds votes to the current Republican vote total. This procedure is followed for each state tagged, after which the Democrats take their turn.

The Results program is relatively straightforward and doesn't require any involved decisions.

Customization

First, an option to save current status and parameters would allow you to stop in "mid-campaign" and resume later without starting anew.

Second, the basic framework already exists for making Presidential Power a two-player game (rather than human vs. machine). For example, this is why each selection from the Main Menu asks for party affiliation. (Note: Variable HB, when set to 1, indicates that it is time for the computer to campaign.)

In addition, almost any of the simulation's parameters can be adjusted to make the game harder or easier.

But, I think the most enjoyable modification will come from your own imagination. Think up additional trials to befall a candidate. Incorporate these into your own version of Presidential Power. ■

For \$12.50, the author will provide a disk dump of all three Presidential Power programs. Write to him directly: Joel J. Davis, 142 Wildwood, Algonquin, IL 60102.

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—Logo: Where's the Pony?—

What exactly is Logo?
Will it make your child computer-literate?
Is Logo useful only to beginning users,
or is it more sophisticated than you think it is?

by Molly Watt

Logo has been touted by enthusiasts as a magic wand. Buy Logo, load it into your computer's memory and watch your children enter math-land. There, they will converse with a turtle in a "natural" way, become computer literate and learn a language so powerful they will never outgrow its possibilities.

Meanwhile the critics scowl, "Logo is an excellent way to start little kids, but once they've drawn a few boxes and rotated them, let's teach them a "real" computer language like Basic, Pascal or Forth, so they can do something *serious*."

As with most disagreements, there is truth in each viewpoint. Let's look more closely at Logo as a language to see what it offers and where some of the problems are.

The Birth of Logo

The word Logo comes from a Greek root meaning knowledge. Logo was designed as an instructional language. In fact, users often say Logo is a language for learning. It was developed at Massachusetts Institute of Technology and Bolt Beranek and Newman in Cambridge, Massachusetts during the late sixties and early seventies. The work was largely funded by the National Science Foundation. Logo's creators dreamed that this language would apply Piaget's theories about how children learn in a natural environment. Some developers also believed that with Logo they could revolutionize math education.

But, in a fundamental way the Logo

Group, as they became known, were unprepared for the microcomputer "revolution." They created a powerful and flexible language to be implemented on a minicomputer such as the Digital Equipment Corporation PDP-11. Shifting gears to cram an implementation of the language into the memory of a microcomputer was an entirely different proposition, felt by some to be impossible.

By the spring of 1981, Logo made its debut to an expectant public. First available to owners of the Texas Instruments 99/4A with extended memory, it was later added to the Apple II language card. These microcomputers became the threshold and the ceiling for this language, conceptualized to have neither.

Powerful Ideas

What features of Logo raised such high expectations in both the educational and computer science communities? Logo is called a "natural" tool for learning. It combines a child's knowledge about his or her own physical movements with an interest in drawing shapes. Then, by telling a delta shape called a "turtle" how to draw on the graphics screen, the child learns "turtle geometry" and programming in Logo. The learning is at the computer. There are no preliminary flow charts. Just try something and watch what happens.

Once the child draws something he or she likes, the drawing can be kept by 1) giving it a name for calling it again and 2) defining the set of instructions

to the turtle in a place called the EDIT mode. This procedure then can be used to make the turtle draw the picture again and again simply by calling, or typing, its name.

People like to say that Logo teaches "procedural" thinking, which makes it sound like a new brand of thinking. A truer description is that Logo programming forces you to express an idea in a set of small steps called procedures. A child can program the idea of a flower. This can also be expressed by writing a poem, dancing the flower's growth or painting it with fingerpaints.

By defining a procedure for drawing a flower and then revising the procedure for variable inputs, the child can create flowers in different sizes. Add a moveover procedure and a recursion line to keep creating a garden until a stop rule is satisfied, the child interrupts the process or—here comes the ceiling—the workspace is used up.

When an incorrect Logo command is typed, a descriptive statement or "error" message is printed. If you type FD70, a message appears that says, THERE IS NO PROCEDURE FD70. You must either create a procedure named FD70 or retype the command FD 70, so

Molly Watt is a former elementary school teacher and administrator, as well as a parent. Now she is writing Teaching with Logo's Power, to be published by Addison-Wesley in 1984, and she coordinates the Institute in Educational Computing at Keene State College, Keene, NH. You can write to her at Gregg Lake Road, Antrim, NH 03440.

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**"Those who have employed the language
successfully with young children have done so by
overcoming an inappropriate machine."**

that the turtle knows to move FORWARD 70 turtle units.

If you decide to create a new procedure named FD70, you extend the available Logo language by creating a new command, FD70, that can be used like a primitive. If Logo doesn't have an existing primitive that you want, simply create an appropriate procedure.

More Uses for Logo

Logo teaches turtle geometry, which does not rely on x and y coordinates. They do exist in the language, but should be employed sparingly as their use eclipses some of the power of the language. This geometry is based on the turtle's position and heading, and includes the possibility of using any procedure as a subprocedure in another superprocedure.

Logo has list processing capabilities. It can hold a list of any number of components and the flexibility to increase or decrease this number is unlike the system of arrays used to handle lists in other languages such as Basic.

A program can contain a REQUEST or READLIST command for interjecting new information into the program. By using a MAKE statement, this information becomes permanent. The program can pass information back and forth between procedures internally and later OUTPUT the results to the user. This output could be a score, or it could be a poem created with words the user inputs.

Most of the time you use Logo in the DRAW or NODRAW mode, where commands make something happen as you type them. By typing EDIT and a procedure's name you can enter the EDIT mode—or the recipe box—at any time.

Stumbling over the Threshold

If you are a first grade teacher and have read *Mindstorms* by Seymour Papert, you might expect that your students will just sit down at the computer and take off for mathland. In some cases this does happen. However, most teachers and parents of young children have experienced frustration and surprise at the amount of help they must provide. They must beg, borrow, steal or write instant programs so a non-reader can use single keystroke

commands. They must make mazes and story graphics to give meaning to FORWARD and BACK movements of the turtle. They must create cue cards for correctly spelling commands. They must generally be at the child's side to support the Logo experience.

The Apple and other microcomputers are not designed to meet the developmental needs of a young child. This is a state-of-the-art fact about computers in 1984. Joystick and paddle controls need to be made available. Graphics pads with only the specific commands necessary should be created. Controls should be arranged in a way that makes sense to a child—rather than teaching typing skills in the first grade. Robot turtles need to be available as a concrete object for a young child to think with. Two monitors would allow instant access to the DRAW and NODRAW modes and the EDIT mode at all times, making these abstract "places" less confusing for concrete thinkers.

We are kidding ourselves to think that there is no threshold to be crossed in learning to use Logo. Those who have employed the language successfully with young children have done so by overcoming an inappropriate machine.

Bumping into the Ceiling

In addition to the threshold to be negotiated, there is also a ceiling restricting present implementations of Logo. I worked as a consultant to the group who designed Delta Drawing. The original idea was to create a program that would give immediate computer access to anyone—fulfilling Papert's vision—with an instant drawing program. The first Delta Drawing programs were, in fact, embellished instant programs written in Logo. But Logo offered limited memory and worked very slowly. Eventually the group abandoned Logo and created the commercially available Delta Drawing program (Spinnaker Software) with Forth. Logo was simply an inappropriate language.

Dr. Tony Stavely of Keene State College in Keene, New Hampshire, creates Logo tools for his work as a psychologist and a professor. He primarily employs the list processing

capabilities.

His first Logo project was to calculate means and standard deviations of student grades. He tried the LENGTH tool procedure in Abelson's manual, but ran into trouble immediately. The embedded recursion worked to about 63 levels and then ran out of memory. However, he had more than eighty students in one course.

Dr. Stavely rewrote the procedure to use tail recursion, where a procedure calls another procedure by the same name just before its end, rather than in the middle as in embedded recursion. Even so, Dr. Stavely ruefully admits that he finds jotting information into a gradebook and using a hand calculator easier.

When Logo for the Apple was redesigned in 1981, a redefinition of tail recursion made more memory available in the workspace. But the fix is not internally consistent Logo; it's a hack.

Perhaps you think that this example is too esoteric and unlikely to happen to you. But think about teaching the turtle to draw a circle. One of the most common ways is:

```
TO CIRCLE
FORWARD 1
RIGHT 1
CIRCLE
END
```

This could not draw a complete circle in many Logo versions, since recursion works in an internally consistent way. It is only through the "hack" that what is conceptually obvious can be implemented on current hardware.

Logo Backlash?

Some researchers at Bank Street College in New York City have criticized the notion that Logo is natural, and this point of view has aroused hard feelings among many in the Logo community who fear a Logo backlash. But it is true that Logo cannot describe things that happen simultaneously. Logo procedures work one after another, each called in turn by the user or another procedure, while in life, many processes happen in parallel. Two languages developed to deal with parallel processing are Simula and Smalltalk.

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When I think of Logo in today's schools, I am reminded of the old joke about how to tell a pessimist from an optimist. A pessimist sits in a room full of toys and says "I don't have anything to play with." The optimist sits in a room full of manure singing "There must be a pony in here somewhere." Substitute Logo critic for pessimist and Logo fan for optimist.

What is actually needed is more consciousness of our own responsibility for creating this new computer culture. There are many exciting possibilities. But let's not wear blinders and obscure some very real problems. It's up to us to understand what is both possible and impossible in Logo, taking into account the limitations of the Apple II, and capitalize on that. We must create the best computer culture we can. I believe that Logo has a strong role to play. ■

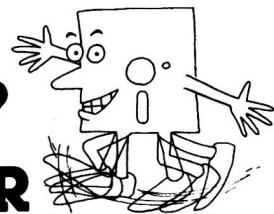
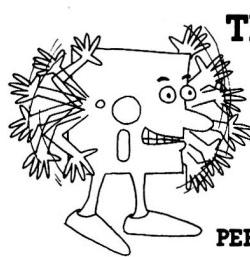
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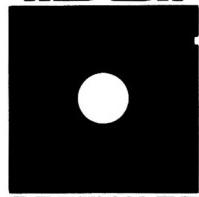
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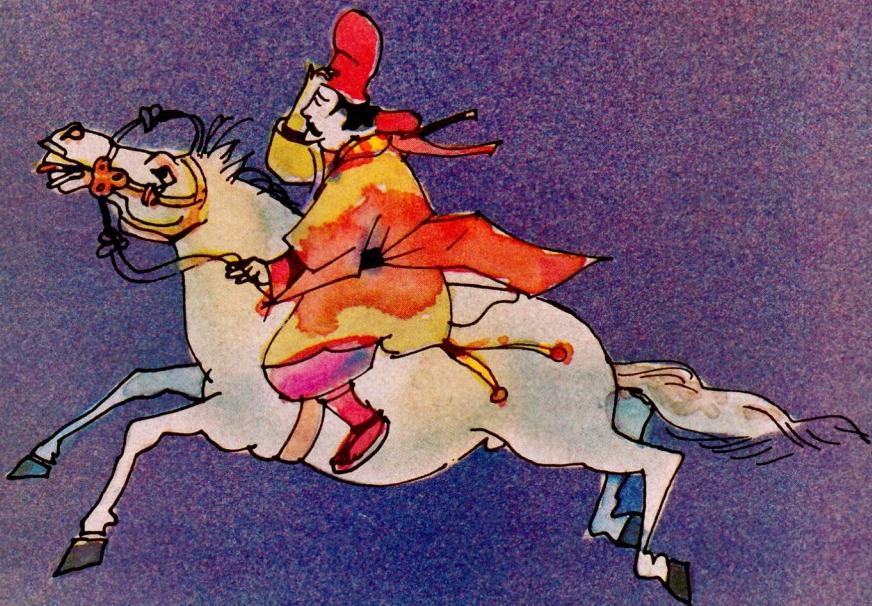
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SHOGUN



by Robert R. Devine

Shogun is played on a 8×8 playing board. Each player begins with one king and seven pawns. The object of the game is to move your playing pieces around the board and take your opponent's king. You take your opponent's pieces by landing on them. You may move your pieces forward, backward or sideways; diagonal moves are not allowed. All moves must be either straight or L-shaped; no zig-zagging is permitted. The program includes game instructions.

Each piece is marked with a number from 1-4 which indicates the number of spaces that the piece may move. After each move, the number on the playing piece will change. One set of playing pieces is green and the other set is white. If you're playing on a green monitor or black-and-white television, one set will be white and the other set will have vertical stripes. The kings are marked with black rectangles.

I wrote Shogun for use with game paddles and later added a keyboard option. If you choose keyboard control, you will use the I-J-K-M keys to move your marker about the screen,

and then touch the space bar to make your move selections. When playing with the paddles, turn your dial until the flashing marker is on the piece you want to move, then press the paddle button. Next move the marker to its destination, and press the button again to move the playing piece.

If the move was a legal one, the piece will move to its new place on the board and the next player can play. The player will be advised if an illegal move is attempted, and then be required to start over by again selecting which piece is to be moved. In the event that a player decides to move a piece other than the one originally selected, he can simply enter an illegal move and then can go back and select a different piece.

Entering the Program

The program consists of the main Applesoft program, SHOGUN, and a shape table, SHOGUN SHAPES \$6000. You should first enter the Applesoft listing, and when finished SAVE SHOGUN. Since I have a IIe with upper/lower case, I used both upper and lower case letters in the instructions. If

you don't have lower case, then you'll have to enter all the instructions in upper case.

Next, enter the SHOGUN SHAPES \$6000 file. First access the monitor using CALL-151. Now enter 6000:A2 2E BD D0 92, and so on, until you've filled about four lines on the screen. Next, press return, enter another colon, and enter another four lines. Continue this process until the entire listing is entered. Be sure to enter the last three 00 bytes at the end of the file or the space shape won't work properly. Finally, return to Applesoft using 3D0G, and BSAVE SHOGUN SHAPES \$6000,A\$6000, L\$373.

The Shogun Shapes \$6000 File

If you were to enter 6000L from within the monitor, you would find that the first 17 bytes in the file translate into a short machine-code routine. This translates the ASC code of string text input into the proper shape number for that character for use in printing text on the hi-res screen. Line 470 of the Applesoft program uses this routine. The next 46 bytes in the file represent an ASC code table that is used by the

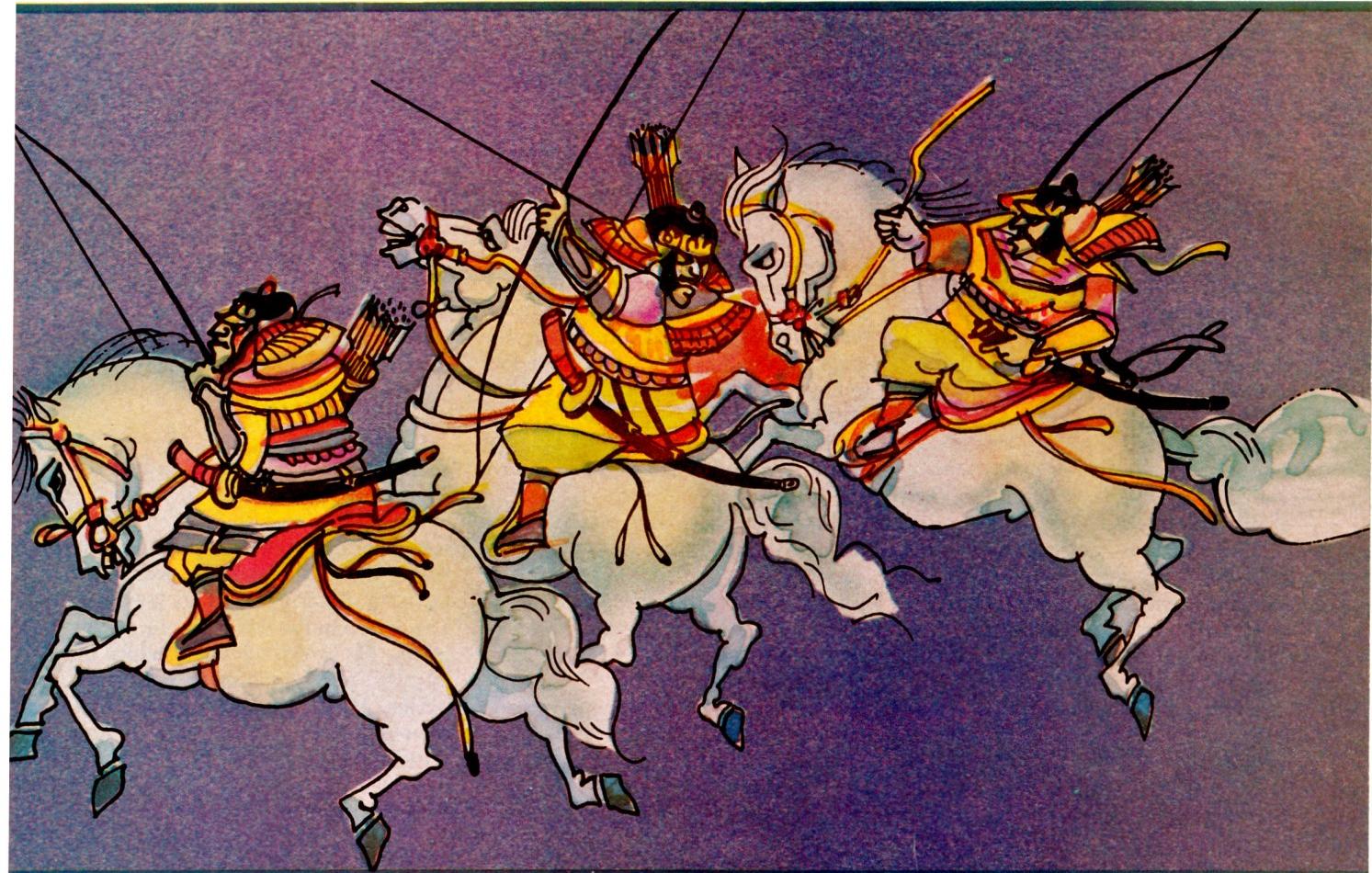


Illustration by Phil Geraci

machine code routine we just looked at. If you poke the ASC code of a text character into location 25 (\$19), and then call the routine at \$6000 (24576), the proper shape number will be placed in location 25 for a draw statement to use in placing that text character on the hi-res screen.

The balance of the file is a shape table which contains the following characters:

- The numbers 0-9 and a blank (shapes 1-11)
- The alphabet characters A-Z (shapes 12-37)
- The special characters ?, !, +, -, =, \$ (shapes 38-46)
- An Apple (shape 47)
- A rectangle used to mark the box your piece is on (shape 48)
- Two different Shogun playing pieces (shapes 49-50).

While this table contains more shapes than the program actually uses, you might find it handy in other programs that you write.

How the Program Works

The program is heavily REMed so you should be able to follow it easily.

The first thing you should look at is how I've identified the playing pieces. The complete status of the board is contained in an array N(8,8), and the players are numbered 1 and 2. The value stored in each array element (representing a board square) is 10 times the player number plus the move number marked on the piece. A piece for player 1 with a move of 3 would be $10 \times 1 + 3 = 13$, and a piece for player 2 with a move of 2 would be $10 \times 2 + 2 = 22$. If the piece is a king, the value would be negative, i.e. -13 or -22. The value of a square with no playing piece is zero.

Now let's go through the program in the *order of execution*.

It begins at line 680 where the shapes are loaded, pointers set, and shape parameters established.

Lines 690-870 take care of the program instructions and obtain the players' names. The instructions will differ slightly depending on whether keyboard or paddle input was selected.

Lines 480-500 draw the starting board and the beginning positions of all the playing pieces. Then the beginning move for each piece is selected

and the array value established.

Line 520 is where the main program begins, and the proper player is selected.

Lines 540-565 handle the selection of which piece the player wants to move. Which instructions will be executed here is dependent on whether the game is being played with keyboard or paddles.

Lines 570-575 prevent the player from selecting a starting square where that player doesn't have a playing piece.

Lines 580-620 handle the selection of where the player wants to move the piece, with line 600 protecting against erasing the start marker in the paddle version.

Now that both start and destination have been selected, execution jumps to line 120 where the X and Y offsets and signs are determined.

Line 130 checks to see that the move is equal to that marked on the piece.

Lines 140-155 advise of an illegal

"By designing your shapes differently, you can display red, green, purple, blue, or white."

move, erase the start and destination markers, and send the player back to try again. In the keyboard version the marker for beginning a move will always be placed in square 4,4 at the beginning of each player's turn, while in the paddle version the marker will be located based on the setting of the paddle dial.

Line 160 starts the jump tests to prevent jumping over other pieces.

Lines 170-180 test straight up/down or side/side moves.

Line 190 tests moves that go both sideways and up/down (L-shaped moves). In this case it is necessary to check two possible paths to see if either path can be taken without jumping another piece.

Lines 300-310 conduct the actual jump tests. The loops are written in a way that allows them to be bi-

directional loops, which simply means that by using the SGN function, the same loop could count either from low to high, STEP +1, or from high to low, STEP -1.

Lines 320-340 test to see if a king has been taken and whether a legal move has been made.

Line 350 erases the playing piece and moves the marker where the piece started.

Line 360 sets the start square array element to zero, erases the piece (if there was one) and moves the marker to the destination.

Line 380 draws the playing piece at its new location, sets the move number, and sets the array value of the new

location to its proper value.

Line 400 resets the king marker when a king is moved.

Line 410 erases the text area and jumps to the next player's move.

Lines 430-440 are where we translate the 0-255 values of the paddle dial into the 64 possible array coordinate sets.

Lines 442-447 move the marker about the playing board in the keyboard version.

You will notice that, even though our playing pieces are green and white, the only values we ever set for HCOLOR are 0 (black) and 3 (white). This is due to the design of our playing pieces. By designing your shapes differently, you can display red, green, purple, blue, or white and get those colors by setting HCOLOR=3 (white1) or HCOLOR=7 (white2). ■

Listing 1. Shogun.

```

100 HOME
110 GOTO 680
120 XO = X1 - X:YO = Y1 - Y: REM ESTABLISH
    X & Y OFFSETS WITH PROPER SIGN
130 IF XO * SGN (XO) + YO * SGN (YO) = N(
    X,Y) * SGN (N(X,Y)) - 10 * P THEN 160:
    REM IS MOVE EQUAL TO # ON PIECE ?
140 HCOLOR= 3:A$ = "ILLEGAL":VT = 20: GOSUB
    470:A$ = "MOVE !!":VT = 21: GOSUB 470
150 FOR Z = 1 TO 8: PRINT CHR$(7): NEXT :
    XDRAW 48 AT XN,YN: ON IP GOTO 155: XDRAW
    48 AT XC,YC
155 GOSUB 640: GOTO 535: REM ERASE MOVE MA
    RKERS
160 J = 0:F = 0: REM JUMP TESTS
170 IF X1 = X THEN GOSUB 210: GOTO 320: REM
    TEST UP/DOWN AT X
180 IF Y1 = Y THEN GOSUB 240: GGOTO 320: REM
    TEST <-/-> AT Y
190 GOSUB 210: GOSUB 300: ON ((J = 1 AND N(
    X1,Y1) < > 0) OR (J = 0)) GOTO 320: J =
    0: GOSUB 240: GOSUB 270: ON ((J = 1 AND
    N(X1,Y1) < > 0) OR (J = 0)) GOTO 320: GOTO
    340: REM TEST 2 PATHS FOR NO JUMPS
200 REM TEST UP/DOWN AT X
210 FOR T = Y + SGN (YO) TO Y1 STEP SGN (
    YO): IF N(X,T) < > 0 THEN J = J + 1
220 NEXT : RETURN
230 REM TEST <-/-> AT Y
240 FOR T = X + SGN (XO) TO X1 STEP SGN (
    XO): IF N(T,Y) < > 0 THEN J = J + 1
250 NEXT : RETURN
260 REM TEST UP/DOWN AT X1
270 FOR T = Y + SGN (YO) TO Y1 STEP SGN (
    YO): IF N(X1,T) < > 0 THEN J = J + 1
280 NEXT : RETURN
290 REM TEST <-/-> AT Y1
300 FOR T = X + SGN (XO) TO X1 STEP SGN (
    XO): IF N(T,Y1) < > 0 THEN J = J + 1

```

Listing continued.

Listing 2. Shogun Shapes \$6000.

```

6000- A2 2E BD 11 60 C5 19 F0
6008- 05 CA D0 F6 A2 0B 86 19
6010- 60 00 30 31 32 33 34 35
6018- 36 37 38 39 20 41 42 43
6020- 44 45 46 47 48 49 4A 4B
6028- 4C 4D 4E 4F 50 51 52 53
6030- 54 55 56 57 58 59 5A 3F
6038- 2E 2C 21 27 2B 2D 3D 24
6040- 00 35 00 6C 00 7A 00 84
6048- 00 8E 00 99 00 A5 00 B1
6050- 00 BC 00 C4 00 D0 00 00 30
6058- 03 DC 00 E8 00 F4 00 FE
6060- 00 09 01 15 01 20 01 2B
6068- 01 37 01 41 01 4B 01 57
6070- 01 5E 01 6B 01 78 01 83
6078- 01 8C 01 98 01 A4 01 B0
6080- 01 B7 01 C0 01 CA 01 D6
6088- 01 E2 01 EB 01 F5 01 FD
6090- 01 02 02 08 02 0D 02 12
6098- 02 1A 02 1F 02 27 02 35
60A0- 02 70 02 9C 02 D7 02 00
60A8- 00 00 00 00 00 00 32 76
60B0- 2D 0C 24 24 1C 3F 4E BA
60B8- 17 06 00 12 2C 2C 36 36
60C0- 6E 1A 3F 3F 00 62 2D 15
60C8- BE 17 BF 2E 2D 2D 00 62
60D0- 2D 15 FE 2A 15 F6 3F 1C
60D8- 04 00 49 36 AE 37 26 1C
60E0- 3F 27 21 21 21 00 2D 2D
60E8- DE 1B 36 2D AD F6 3F 1C
60F0- 04 00 09 F5 BB 36 76 2D
60F8- 0C E4 3F 07 00 66 2D 35
6100- 17 17 36 36 00 29 AD B6
6108- F6 3F 1C 64 2D 3F 1C 24
6110- 00 32 0E 2D 9E 13 65 0C
6118- 24 E4 3F 07 00 29 AD 36
6120- 36 FE 1B 24 24 AC 2A 35
6128- 00 2D AD B6 F6 3F 27 24
6130- 24 95 2D 06 00 29 AD 96

```

Listing continued.

Listing 1 continued.

```

310 NEXT : RETURN
320 IF J = 1 AND SGN (N(X1,Y1)) = - 1 AND
    INT (N(X1,Y1) * SGN (N(X1,Y1)) / 10) =
    OP THEN 650: REM GAME OVER - OPPONENTS
        KING TAKEN
330 IF J = 1 AND INT (N(X1,Y1) * SGN (N(X1,Y1)) / 10) = OP THEN 350: REM OPPONE
    NTS PIECE TAKEN/REMOVE IT FROM BOARD
340 IF J > 0 THEN HCOLOR= 3:A$ = "NO JUMPI
    NG":VT = 20: GOSUB 470:A$ = "ALLOWED !!
    !":VT = 21: GOSUB 470: GOTO 150: REM I
    LLEGAL MOVE - START OVER
350 F = 1: HCOLOR= 0: FOR Z = YC TO YC + 21:
    HPLOT XC,Z TO XC + 22,Z: NEXT : ON (N(
    X,Y) > 0) GOTO 360:F = - 1: REM ERAS
    E AT X,Y
360 N(X,Y) = 0: FOR Z = YN TO YN + 21: HPLOT
    XN,Z TO XN + 22,Z: NEXT : REM ERASE AT
    X1,Y1
370 HCOLOR= 3
380 DRAW 49 + P - 1 AT XN,YN:R = INT ( RND
    (1) * 4 + 1): DRAW R + 1 AT XN + 9,YN +
    6:N(X1,Y1) = (P * 10 + R) * F: IF F = 1
    THEN 410: REM DRAW PIECE AT NEW LOCATI
    ON
    HCOLOR= 0
400 XC = XN:YC = YN: GOSUB 630: REM MAKE IT
    A KING
410 GOSUB 640: GOTO 520: REM MOVE COMPLETE
    - ERASE TEXT - NEXT PLAYER
420 HCOLOR= 3: HGR2 : FOR X = 83 TO 275 STEP
    24: HPLOT X,0 TO X,184: NEXT : FOR Y =
    0 TO 184 STEP 23: HPLOT 83,Y TO 275,Y: NEXT
    : RETURN : REM DRAW STARTING GRID
430 T = 8:PD = PDL (P - 1):YP = INT (PD /
    32 + 1): FOR F = 4 TO 32 STEP 4: IF PD >
    = YP * 32 - F THEN XP = T:F = 32: REM
    SET X,Y ARRAY SUBSCRIPTS FROM PADDLE R
    EADING
440 T = T - 1: NEXT F: RETURN
442 GET A$:Z1 = 0: IF A$ = "I" AND YP > 1 THEN
    YP = YP - 1: RETURN
443 IF A$ = "J" AND XP > 1 THEN XP = XP - 1
    : RETURN
444 IF A$ = "K" AND XP < 8 THEN XP = XP + 1
    : RETURN
445 IF A$ = "M" AND YP < 8 THEN YP = YP + 1
    : RETURN
446 IF A$ = CHR$ (32) THEN Z1 = 1: RETURN
447 GOTO 442
450 XC = X * 24 + 60:YC = Y * 23 - 22: RETURN
    : REM TRANSLATE ARRAY COORDS
460 XN = X1 * 24 + 60:YN = Y1 * 23 - 22: RETURN
    : REM TO SCREEN COORDS.
470 VT = VT * 8: FOR Z = 1 TO LEN (A$): POKE
    25, ASC (MID$ (A$,Z,1)): CALL 24576: DRAW
    PEEK (25) AT Z * 7 - 7,VT: NEXT : RETURN
    : REM SCREEN VTAB SIMULATING PRINT ROU
    TINE
480 HGR2 : GOSUB 420: FOR X = 1 TO 8: HCOLOR=
    3:Y = 1:P = 1:Z = 0: GOSUB 500:Y = 8:P =
    2:Z = 1: GOSUB 500: NEXT X
490 N(4,1) = N(4,1) * - 1:N(5,8) = N(5,8) *
    - 1:X = 4:Y = 1: GOSUB 450: HCOLOR= 0:
    GOSUB 630:X = 5:Y = 8: GOSUB 450: GOSUB
    630: GOTO 520: REM SET STARTING KINGS
500 GOSUB 450:R = INT ( RND (1) * 4 + 1): DRAW
    49 + Z AT XC,YC: DRAW R + 1 AT XC + 9,Y
    C + 6:N(X,Y) = P * 10 + R: RETURN : REM
    DRAW STARTING PIECES
510 REM MAIN GAME STARTS HERE
520 P = P + 1: IF P = 3 THEN P = 1

```

Listing 2 continued.

```

6138- 32 3B E7 24 24 04 00 2D
6140- AD 36 36 1E 3F 27 24 24
6148- 04 00 2D 2D 96 92 3F 3F
6150- 24 24 AC 2A 2D 00 2D 2D
6158- DE 1B 36 2D F5 1B 36 05
6160- 00 29 AD 97 35 F6 3F 1C
6168- 24 24 04 00 36 36 36 4D
6170- 21 24 3F 67 09 24 04 00
6178- 2D 2D DE 36 36 9F 2D 2D
6180- 04 00 49 2D 1E 36 36 1E
6188- 3F 1C 04 00 36 36 36 4D
6190- E1 1C 1C 0C 0C 0C 04 00
6198- 36 36 36 2D 2D 05 00 36
61A0- 36 36 4D 21 24 24 BC 1E
61A8- 1C 56 06 00 36 36 36 4D
61B0- 21 24 24 FC 93 15 15 06
61B8- 00 29 AD 36 36 1E 3F 1C
61C0- 24 24 04 00 2D AD F6 3F
61C8- 27 B4 32 36 00 29 AD 36
61D0- B6 1C 1C 16 E7 24 24 04
61D8- 00 36 36 36 4D E1 1C 7C
61E0- 65 E4 3F 07 00 29 AD DF
61E8- 33 0E 2D 15 F6 3F 1C 04
61F0- 00 2D 2D DE 36 36 36 00
61F8- 36 36 76 2D 0C 24 24 24
6200- 00 36 36 15 15 0C 0C 24
6208- 24 04 00 36 6E FE 36 0C
6210- 0D 35 24 24 24 04 00 2E
6218- AA 17 17 6E 09 E4 1C 0C
6220- 0C 24 00 36 15 96 21 64
6228- 0C 24 04 00 2D 2D BE 17
6230- 17 17 2E 2D 2D 00 62 2D
6238- 15 BE 17 16 05 00 92 52
6240- 35 3F 00 92 52 31 1E 07
6248- 00 09 36 B6 32 00 29 36
6250- 27 04 00 12 65 AC 11 3F
6258- 36 06 00 92 2D 2D 05 00
6260- 12 2D 2D 16 3F 3F 07 00
6268- 09 8D 3F BF 0D 15 3F 0E
6270- 0D 1E 3F 77 29 00 92 36
6278- 2D 2C 3F 3F 3E 3C 3E 38
6280- 28 2D 6D 2D 2D 38 3F 3F
6288- 3F 3F 2C 2D 2D 2D 2D
6290- 2D 3C 3F 3F 3F 3F 2C
6298- 2D 2D 2D 2D 3C 3F 3F
62A0- 3F 3F 3F 0C 2D 2D 2D 2D
62A8- E5 FF FF 67 09 25 2D 2D
62B0- 00 2D 2D 2D 2D 2D 2D 2D
62B8- 2D 2D 2D 2D 36 36 36
62C0- 36 36 36 36 36 36 3E 3F
62C8- 3F 3F 3F 3F 3F 3F 3F 3F
62D0- 3F 27 24 24 24 24 24 24
62D8- 24 24 24 24 00 49 92 32
62E0- 36 36 36 36 36 36 4E 24
62E8- 24 24 24 24 24 24 24 6E
62F0- 6C 6E 6C 66 31 36 36 36
62F8- 36 FE DB DB 9B 36 36 0D
6300- 24 24 0D 36 36 0D 24 24
6308- 0D 36 36 0D 24 24 95 0A
6310- 24 24 24 24 24 24 24 00
6318- 09 11 92 36 36 36 36 36
6320- 36 36 09 2D 2D 2D 2D 2D
6328- 2D 3C 3F 3F 3F 3F 3F 3F
6330- 2C 2D 2D 2D 2D 2D 2D 35
6338- 25 24 24 24 24 24 24 1C
6340- 3B 3F 3F 3F 3F 3F 3F 32
6348- 36 36 36 36 36 36 2D 2D
6350- 2D 2D 2D 2D 24 24 24 24
6358- 24 3C 3F 3F 3F 3F 3F 3F
6360- 36 36 36 36 2D 2D 2D 2D
6368- 2D 2D 2D 24 24 24 24 24
6370- 00 00 00 FF

```

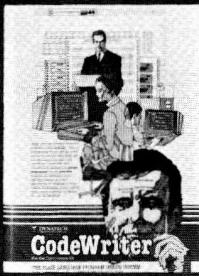
Listing continued.

Listing 1 continued.

```

530 OP = 1: IF P = 1 THEN OP = 2
535 ON (IP = 2) GOTO 540:XP = 4:X = 4:YP =
4:Y = 4: HCOLOR= 3:XC = 156:YC = 70: DRAW
48 AT XC,YC
540 HCOLOR= 3:A$ = P$(P) + "'S":VT = 5: GOSUB
470:A$ = "TURN.":VT = 7: GOSUB 470:A$ =
"SELECT":VT = 10: GOSUB 470:A$ = "START
..":VT = 12: GOSUB 470
550 ON IP GOSUB 442,430:X = XP:Y = YP:ZO =
XC:YO = YC: GOSUB 450: HCOLOR= 3
560 DRAW 48 AT XC,YC: ON IP GOTO 565: IF PEEK
( - 16285 + P - 3) < 128 THEN XDRAW 48
AT XC,YC: GOTO 550: REM READ PADDLE F
OR START SELECTION
562 GOTO 570
565 IF Z1 = 0 THEN XDRAW 48 AT XO,YO: GOTO
550: REM READ KEYBOARD FOR START SELEC
TION
570 IF INT (N(X,Y) * SGN (N(X,Y)) / 10) =
P THEN 580
575 ON IP GOTO 550: XDRAW 48 AT XC,YC:: GOTO
550
580 PRINT CHR$(7): HCOLOR= 3:A$ = "SELECT
":VT = 15: GOSUB 470:A$ = "DESTINATION"
:VT = 17: GOSUB 470
585 XN = XC:YN = YC
590 ON IP GOSUB 442,430:X1 = XP:Y1 = YP:ZO =
XN:YO = YN: GOSUB 460: HCOLOR= 3
600 ON IP GOTO 610: IF X1 = X AND Y1 = Y THEN
590: REM LEAVE STARTING POINT MARKED
610 DRAW 48 AT XN,YN: ON IP GOTO 615: IF PEEK
( - 16285 + P - 3) < 128 THEN XDRAW 48
AT XN,YN: GOTO 590: REM READ PADDLE F
OR DESTINATION SELECTION
612 GOTO 620
615 IF Z1 = 0 THEN XDRAW 48 AT XO,YO: GOTO
590: REM READ KEYBOARD FOR DESTINATIO
N SELECTION
620 PRINT CHR$(7): GOTO 120: REM TEST FO
R LEGAL MOVES-MOVE PIECES
630 FOR Z = YC + 15 TO YC + 17: HPLOT XC +
7,Z TO XC + 15,Z: NEXT : RETURN : REM
MAKE IT A KING
640 HCOLOR= 0: FOR Z = 0 TO 80: HPLOT Z,40 TO
Z,191: NEXT : RETURN : REM ERASE TEXT
650 GOSUB 640: HCOLOR= 3:A$ = P$(P):VT = 4:
GOSUB 470:A$ = "WINS !!!":VT = 6: GOSUB
470: FOR X = 1 TO 7: PRINT CHR$(7): NEXT
:A$ = P$(OP) + "'S":VT = 9: GOSUB 470:A
$ = "KING IS":VT = 11: GOSUB 470:A$ =
"GONE.":VT = 13: GOSUB 470
660 A$ = "ANOTHER":VT = 20: GOSUB 470:A$ =
"GAME ?":VT = 22: GOSUB 470: GET B$: IF
B$ = "Y" THEN CLEAR : TEXT : GOTO 710
670 TEXT : HOME : PRINT : PRINT CHR$(4)"C
ATALOG": END
680 PRINT CHR$(4)"BLOAD SHOGUN SHAPES $60
$0": POKE 232,65: POKE 233,96: SCALE= 1
: ROT= 0
690 TEXT : HOME : VTAB 10: PRINT TAB(16)"SHOGUN
": PRINT : PRINT TAB(12)"COP
YRIGHT 1983": PRINT : PRINT TAB(11)"ROBERT R. DEVINE"
695 PRINT : PRINT TAB(10)"EL DORADO, ARKA
NSAS"
700 VTAB 20: PRINT TAB(7)"NEED INSTRUCTIO
NS ? (Y/N)": GET A$
710 HOME : VTAB 10: INPUT "FIRST PLAYERS NA
ME": ;P$(1): PRINT : INPUT "SECOND PLAY
ERS NAME": ;P$(2)
715 PRINT : PRINT "(K)EYBOARD OR (P)ADDLES
": ; GET B$:IP = 1: IF B$ = "P" THEN IP
= 2
720 IF A$ < > "Y" THEN 480
730 HOME : PRINT "SHOGUN IS PLAYED ON AN 8
X 8 PLAYING": PRINT "BOARD. EACH PLAYER
BEGINS WITH 1 KING": PRINT "AND 7 PAWN
S. THE OBJECT OF THE GAME IS": PRINT "T
O CAPTURE THE OPPONENTS KING."
740 PRINT : PRINT "EACH PIECE IS MARKED WIT
H A RANDOM": PRINT "NUMBER FROM 1-4. TH
E PLAYER MAY MOVE": PRINT "HIS PIECE BA
CKWARD, FORWARD, OR SIDE-": PRINT "WAYS
THE NUMBER OF SPACES MARKED ON": PRINT
"THE PIECE. AFTER EACH MOVE, THE NUMBER
"
750 PRINT "MARKED ON THE PIECE WILL CHANGE.
IF A": PRINT "PIECE LANDS ON AN OPPONE
NTS PAWN, THE": PRINT "OPPONENT LOSES T
HAT PAWN.": PRINT : PRINT "NO JUMPING I
S ALLOWED !!!"
760 PRINT : INVERSE : PRINT P$(1):: NORMAL
: PRINT " WILL PLAY THE ";: INVERSE : PRINT
"GREEN";: NORMAL : PRINT "PIECES, AND"
: FLASH : PRINT P$(2):: NORMAL : PRINT
" WILL PLAY THE ";: FLASH : PRINT "WHIT
E.": NORMAL : PRINT
770 PRINT "THE FOLLOWING DISPLAY SHOWS ALL
THE": PRINT "LEGAL MOVES FOR A PIECE MA
RKED '3'.": PRINT : PRINT : PRINT "TOUC
H ANY KEY TO CONTINUE >":; GET A$
780 HGR2 : GOSUB 420:A$ = "IF YOU":HT = 0:V
T = 1: GOSUB 470:A$ = "STARTED":VT = 3:
GOSUB 470:A$ = "HERE...":VT = 5: GOSUB
470
790 X = 4:Y = 5: GOSUB 450: DRAW 49 AT XC,YC
: DRAW 4 AT XC + 9, YC + 6
800 FOR Z = 1 TO 900: NEXT
810 A$ = "YOU COULD":VT = 8: GOSUB 470:A$ =
"MOVE TO":VT = 10: GOSUB 470:A$ = "ANY
OF":VT = 12: GOSUB 470:A$ = "THESE":VT =
14: GOSUB 470:A$ = "PLACES.":VT = 16: GOSUB
470
820 FOR Z = 1 TO 12: READ X: READ Y: GOSUB
450: DRAW 49 AT XC,YC: DRAW INT ( RND
(1) * 4 + 2) AT XC + 9, YC + 6: NEXT
830 DATA 4,2,5,3,6,4,7,5,6,6,5,7,4,8,3,7,
2,6,1,5,2,4,3,3: REM LEGAL MOVE DISPLA
Y DATA
840 A$ = "TOUCH ANY":VT = 19: GOSUB 470:A$ =
"KEY TO":VT = 21: GOSUB 470:A$ = "CONTI
NUE":VT = 23: GOSUB 470: GET A$
850 TEXT : HOME : VTAB 6: PRINT "YOUR PIECE
MAY ONLY CHANGE DIRECTION": PRINT : FLASH
: PRINT "ONCE":; NORMAL : PRINT " DURIN
G EACH MOVE."
855 ON IP GOTO 865
860 PRINT : PRINT "USE YOUR PADDLE DIAL TO
MOVE TO THE": PRINT : PRINT "PIECE YOU
WANT TO MOVE, THEN PRESS THE": PRINT : PRINT
"BUTTON. NEXT USE THE PADDLE TO MOVE TO
": PRINT : PRINT "YOUR DESTINATION, AND
PRESS THE BUTTON": PRINT : PRINT "AGAI
N TO MOVE YOUR PIECE."
862 GOTO 870
865 PRINT : PRINT "USE THE I-J-K-M KEYS TO
MOVE THE MARKER": PRINT : PRINT "TO THE
PIECE YOU WANT TO PLAY THEN PRESS": PRINT
"THE SPACE BAR TO MAKE YOUR SELECTION."
: PRINT
866 PRINT "NEXT MOVE THE MARKER TO WHERE YO
U WANT": PRINT : PRINT "TO MOVE, AND PR
ESS THE SPACE BAR AGAIN": PRINT : PRINT
"TO MOVE THE PLAYING PIECE."
870 VTAB 22: PRINT "TOUCH ANY KEY TO BEGIN
PLAY";; GET A$: GOTO 480

```



Jeff and Marilyn Mitchell "designed" their new program themselves. CodeWriter wrote all the computer code. The Mitchells' dream is thriving on fulfilling other people's wishes. Their new home business needs very special information fast: Which fantasies are still open?

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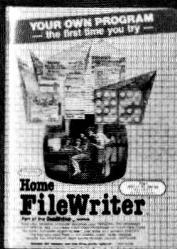
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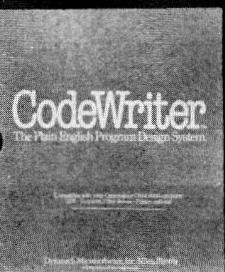
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inCider's inSidious inSolubles

by Art Ude

Welcome to the second in a series of *inCider* inSidious inSolubles. If you're a shrewd, astute and observant programmer, you'll eat up our maddening monthly challenges.

Each month *inCider* will list a short Applesoft Basic program that will seem to run correctly, but there will be something wrong. Oh, you won't see anything as obvious as SYNTAX ERR or any other error for that matter. However, that programmer's sixth sense that you have developed, slaving over a hot keyboard, will "tell" you something is amiss. The answer will be elsewhere in the issue. Some solutions will be very easy, some considerably harder. Some will be "cute," some will be tricky.

The folks at *inCider* encourage their readers to submit their own inSidious inSolubles. While there is no length limit, the shorter the better. All submissions should contain the correct solution and conform to all the specifications below. If your program is especially ingenious, you will receive either a free 12-month subscription to *inCider*, or a 12-month extension of your present subscription. Take a whack at it!

Here are a few guidelines and suggestions for solving an inSoluble:

1. The Basic programs are in straightforward Applesoft. Any poked machine language subroutines and CALLS to that subroutine are correct.
2. You should get some kind of a result from the program; in other words, it shouldn't crash.
3. You should not get an error message of any kind. If you do, check your typing.
4. There will be a short explanation of what the program is supposed to do.

Read this explanation *carefully*. It may contain clues to the problem.

The Distance Finder

Want to know how far your Apple is from the orchard at Cupertino? Try the Listing. It works—sometimes. Cupertino is approximately 37 degrees, 15 minutes north latitude; 122 degrees, 3 minutes west longitude. Find the solution on page 121.

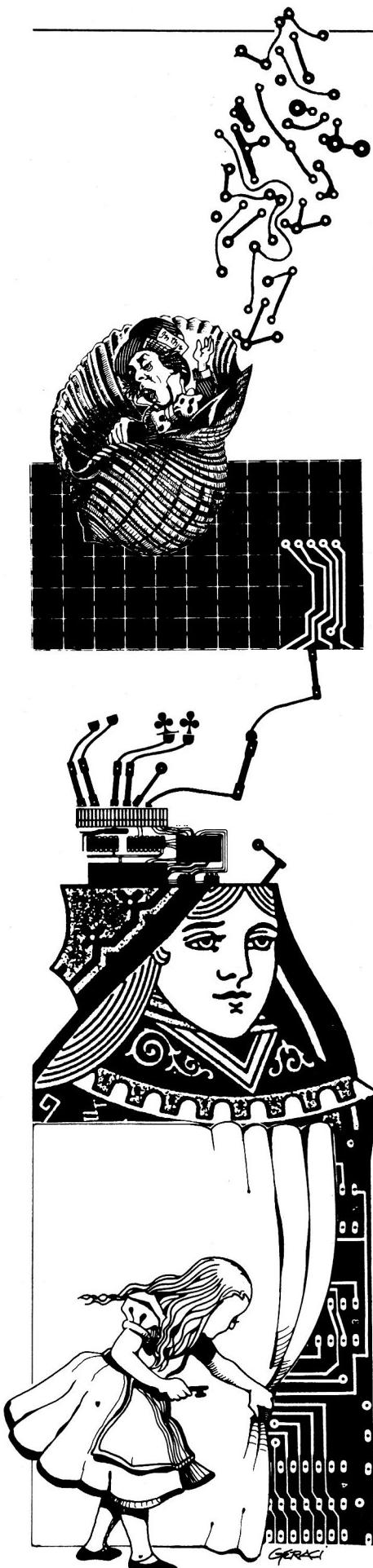
```

10 TEXT : HOME :K = .01745329:Q =
1.57079635
20 PRINT TAB(10)"DISTANCE FIND
ER": PRINT
30 PRINT "ENTER COORDINATES AS D
D:MM": PRINT "(DD=DEGREES, M
M=MINUTES)": PRINT
40 PRINT "IF SOUTH LATITUDE OR E
AST LONGITUDE THENPRECEDE EN
TRY WITH A MINUS (-) SIGN.": PRINT
50 PRINT : INPUT "START LATITUD
E ";DD,MM: GOSUB 200:A = L
60 INPUT "START LONGITUDE";DD,MM
: GOSUB 200:C = L
70 PRINT : INPUT "DESTINATION LA
TITUDE ";DD,MM: GOSUB 200:B = L
80 INPUT "DESTINATION LONGITUDE"
:DD,MM: GOSUB 200:D = L
90 X = SIN (A) * SIN (B) + COS
(A) * COS (B) * COS (D - C
)
100 N = 60 * (- ATN (X / SQR (
-X * X + 1)) + Q) / K
110 N = INT (N * 100 + .5) / 100
120 PRINT : PRINT "DISTANCE= ";N
;" NAUTICAL MILES!"
130 END
200 M = 1: IF DD < 0 THEN H = -
1
210 MM = MM / 100
220 L = (DD + (MM * M)) * K
230 RETURN

```

Program listing. The Distance Finder.

Submit your own *inCider* inSidious inSolubles to Art Ude, c/o *inCider*, Pine St., Peterborough, NH 03458.



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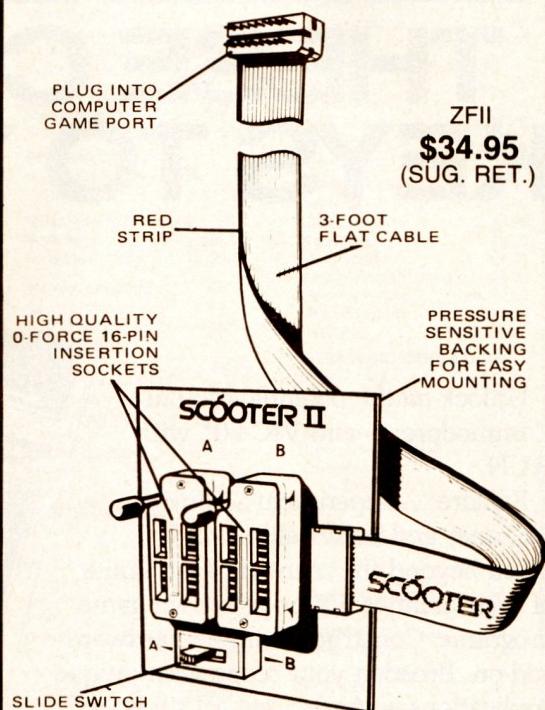


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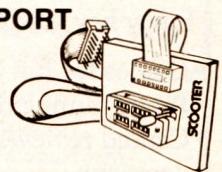
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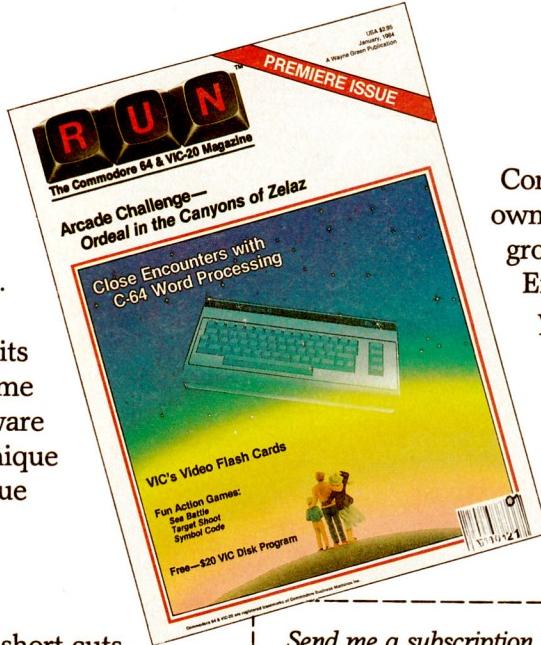
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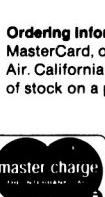
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The Compleat Text File Primer

Part 1 of a Seven-Part Series

Here's everything you ever wanted to know
about disk storage.

by Lee Swoboda

Computers originally were developed to solve massive scientific problems—like number crunching. And they still are indispensable for that purpose. But the advent of text-oriented languages (Cobol, extended Basic) has launched computers into a new area—*word crunching*. As we enter the so-called “Cognitive Revolution,” the text-handling power of computers will eclipse their number-handling power.

On that basis, I make this bold statement: The majority of computer programs are—at least in part—text editors. Word processors, databases and even to some extent the famous “spreadsheet” programs are designed to store, recall and process text. In some cases, the text may be numeric data and consequently may require calculation, but it is text nonetheless. So then, understanding how the Apple II and IIe treat text is vital to our comprehension of computers.

The Compleat Text File Primer is a synopsis of Apple II and IIe text files. The primer is designed for those with a 48K Apple II Plus, an Apple II with a language card (16K RAM card) or an Apple IIe. At least one disk drive and DOS 3.3 are also needed.

The primer will present information in a simple, tutorial manner which makes the subject clear to the novice, but also provides enough depth to interest the more experienced user. I will cover all aspects of text files in seven parts:

1. Text Files on The Disk
2. Text Files in Memory
3. The Disk Operating System

4. Sequential and Random Text Files
5. Sorting Text Files
6. Searching Text Files
7. VisiData, a data spreadsheet summarizing and using the principles learned in Parts 1 through 6.

Types of Disks

Today, the Apple user has a panoply of disk drives from which to choose. They fall into two major categories—hard disk and floppy disk. There are two common sizes of each, 8-inch and 5½-inch. Some manufacturers have introduced 3-inch floppy disks for the Apple.

A hard disk is so named because the “disk” platter is a piece of metal coated with magnetic particles. The data storage densities for hard disks are very high, generally five million bytes for a 5½-inch disk and ten million bytes for an 8-inch disk. This compares with 143 thousand bytes for a standard 5½-inch floppy disk.

The disadvantage to hard disks is that they are not removable; the platter is sealed into the disk unit (although one manufacturer does have a removable hard disk cartridge). Making backup copies of data is therefore difficult, and obviously, any failure will destroy a lot of data. I will not discuss hard disks in detail in this series of articles, but the principles I attribute to the floppy disk also apply to the hard disk.

A floppy disk, as the 5½-inch flexible diskette is called, is composed of a piece of very thin polyester film, coated on both sides with very finely ground iron oxide (rust). The iron ox-

ide acts like millions of little magnets which can record the on/off pulses that represent binary information in the Apple’s memory. The disk drive’s read/write head reads or records these on/off pulses as the computer dictates.

The floppy disk is a cross between a cassette and a phonograph record. Information is recorded magnetically in narrow bands, similar to a cassette, but the tracks are concentric circles, like a phonograph record.

There are two significant deviations from that analogy, however. The information recorded on the cassette is *analog* data. That is, the magnetic field varies in intensity and frequency depending on the amplitude (volume) and frequency of the music being recorded. The information on a disk is *digital*. That is, the magnetic field is always the same intensity and frequency, but is either on or off depending on the bit being recorded.

The second difference is that the groove on a phonograph record is continuous; one single groove spirals inward from the outer edge of the record toward the center. On the disk, the tracks, 35 of them, are concentric circles. The read/write head moves in and out to find each track.

Since the tracks are not physically marked on the disk, the control mechanism for the disk drive determines the position of the read/write head in relation to each track. Each track is divided into 16 sectors, each sector con-

Address correspondence to Lee Swoboda, c/o Padapple Computer Consulting, 1451 NE Paulson Road, Poulsbo, WA 98370.

taining 256 bytes of data and other information, as I shall explain.

Floppy Disk Arrangement

Just as the tracks are not physically marked on the disk, neither are the sectors. The computer, then, must have some way of determining where a sector is and which track it is in. There are two ways of doing this: hard and soft sectoring. The Apple II and IIe use soft sectoring, but you should understand both systems.

In Figure 1, note the index hole in the disk jacket. Carefully rotate one of your disks inside its jacket and note that there is one hole in the disk which passes across the index hole as the disk

rotates. This single hole is indicative of a soft-sector disk. A hard-sector disk will have either 11 or 17 holes for 10 and 16 sector disks, respectively.

By sensing the holes as the disk rotates, a Light-Emitting Diode (LED) in the disk drive tells the computer when to write information to the disk. The Apple II and IIe use a logical marking system for sectors rather than a physical one, so the number of holes in the disk is insignificant for these machines. Just remember that the Apple II and IIe will use *any* 5 1/4-inch disk—the number and arrangement of sector holes is immaterial, since the Apple does its own marking electronically.

As the computer reads from or writes to the disk, it reads or writes to a specific track and sector. When it writes information to a disk, the computer also records on the disk which track and sector contains the information which belongs to a particular file. In this manner, when the program commands the computer to return to read the information it has written, the computer knows where to find it.

DOS cannot process information as rapidly as the disk drive provides it. Consequently, DOS does not read tracks in their order on the disk, but *interleaves*, or skips, tracks to give itself time to process the information in each sector. Because DOS interleaves sec-

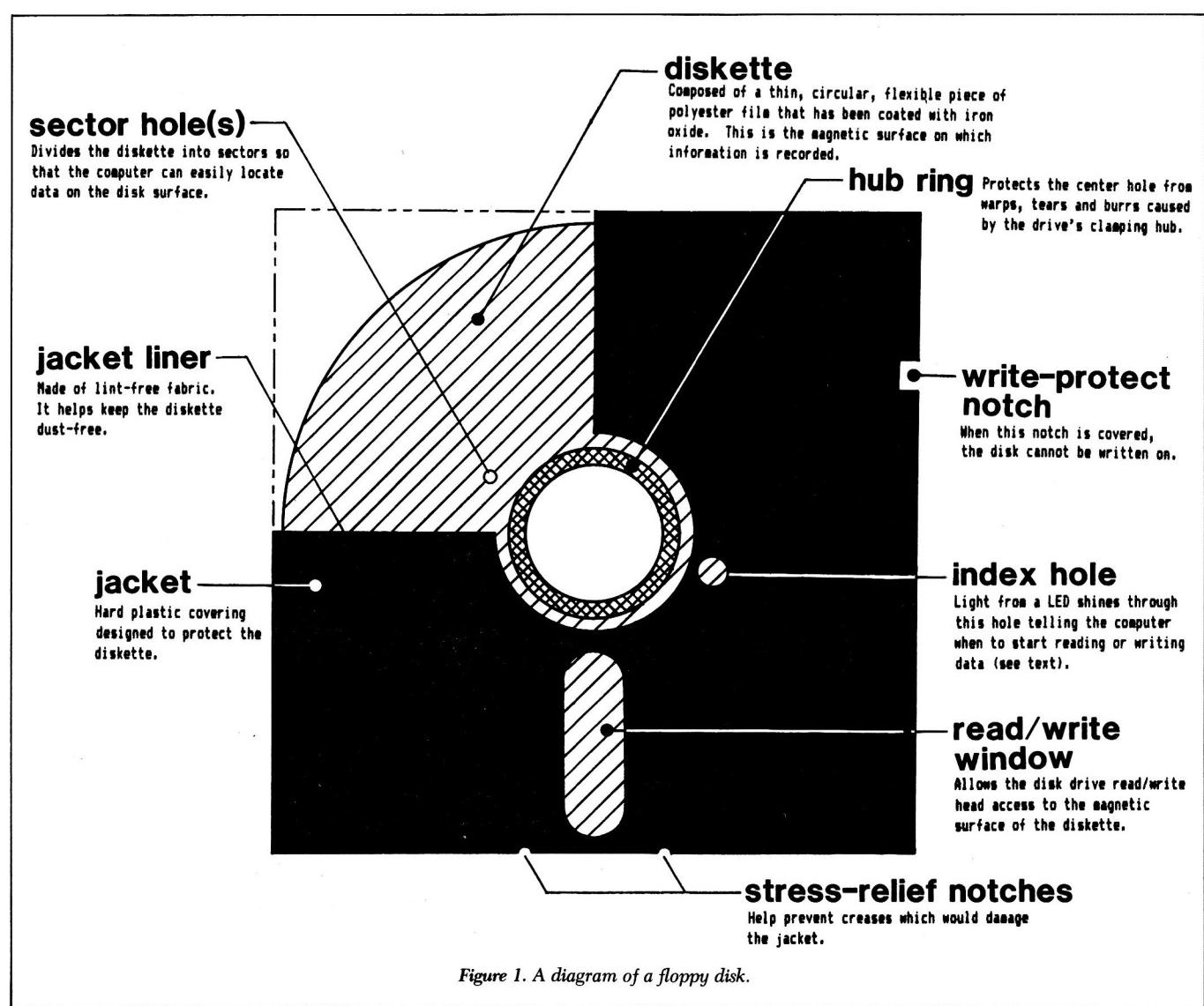


Figure 1. A diagram of a floppy disk.

tors by sevens, the Apple reads disk sectors in the following order: 1, 14, 12, 10, 8, 6, 4, 2, 15, 13, 11, 9, 7, 5, 3, 16. I'll unravel this mystery in Part 3 of this series.

Types of Tracks

All 35 tracks on an Apple II and IIe disk are not the same. Certain tracks are reserved for information that the computer needs to identify where it is on the disk. Four tracks fall into this category: 0, 1, 2 and 17.

Disk Operating System (DOS) and Directory

The three outermost tracks (tracks 0, 1, 2) contain a recording of the Disk Operating System, normally referred to as the DOS image. DOS is the "roadmap" the computer uses for reading and writing information to the disk. Since DOS is not contained permanently in the computer's memory, the computer must get it from somewhere. The "somewhere" is the outer three tracks of the disk. Since the computer cannot access the disk without DOS, the computer goes to tracks 0, 1 and 2 upon booting and loads DOS into computer memory. The "middle" track (track 17) contains the directory, the "layout" of the disk, including file names and which sectors on the disk are already being used.

These four tracks (0, 1, 2 and 17) are reserved for system use. The remaining tracks are available for storing programs or data (31 tracks times 16 sectors times 256 bytes per sector yields 126,976 bytes of data storage available to the user).

As I mentioned, each track is divided into 16 sectors. If we could see these sectors, they would divide the disk into 16 pie wedges. From the computer's viewpoint, each track is continuous, with all sectors passing the read/write head once during each revolution of the disk.

Sectors

When DOS initiates a disk access command (read or write), the read/write head moves to the correct track and begins sending data to the computer. This data is a stream of about 50,000 bits in a loop that spins continu-

ously. Without some way of marking the beginning of the track and sectors, the computer has no way of deciphering the data. Most manufacturers use the LED shining through the index hole to mark the sectors and tell the computer where to start reading the data. Instead, Apple uses gaps.

"Gaps"

Don't strain your eyes looking for gaps on your disk—the gaps really aren't gaps anyway. They are a series of self-synchronous (or auto-sync) bytes. The self-sync bytes are a series of eight high bits (ones), followed by two low bits (zeros). Since the self-sync byte is the only kind of data on the disk with this pattern, the computer knows that this combination indicates the presence of a gap. A *gap* is a series of from five to 90 or so self-sync bytes used to mark locations on the disk. There are three kinds of gaps, used to mark the following:

- *Sector 0 marker.* This is a large gap (40 or more sync bytes) that precedes the first sector to mark the "beginning" of the track.
- *Sector marker.* This is a medium gap (15 to 20 sync bytes) that divides sectors from each other.
- *Address/Data Field marker.* This is a small gap (5 to 10 sync bytes) that divides the address and data fields within each sector. We will examine this subject more thoroughly shortly.

All three gaps are identical except for length. The computer is trained to recognize where it is on a disk by locking into these synchronous bytes.

Types of Sectors— Volume Table of Contents (VTOC)

Just as certain tracks are reserved for specific purposes, certain sectors similarly record specific kinds of data. The first sector of track 17 (sector 0) is the *VTOC*. The VTOC contains miscellaneous data about the disk, but primarily it contains a track bit map of each track on the disk. The track bit map represents which track and sectors have been used to store data or programs. The obvious purpose: to assure that the computer does not reuse sectors that contain valid information. When you use the *DELETE* command,

the computer updates the track bit map to allow reuse of the sectors occupied by the deleted program. When you *SAVE* a program or *WRITE* a text file, DOS checks the track bit map to find usable disk space, then updates the map to prevent reuse.

Catalog

The remaining 15 sectors of track 17 are the disk catalog. Each sector contains information about seven programs or text files (7 times 15 is 105; therefore, a DOS 3.3 disk can contain a maximum of 105 files). The information for each file includes:

- File type—A, I, B or T, for Applesoft, Integer, Binary or Text, respectively. (See page 152 of *The DOS Manual*.)
- File name—up to 30 characters.
- The number of sectors occupied by the file.
- Location of the file's Track/Sector List.

Track/Sector (T/S) List

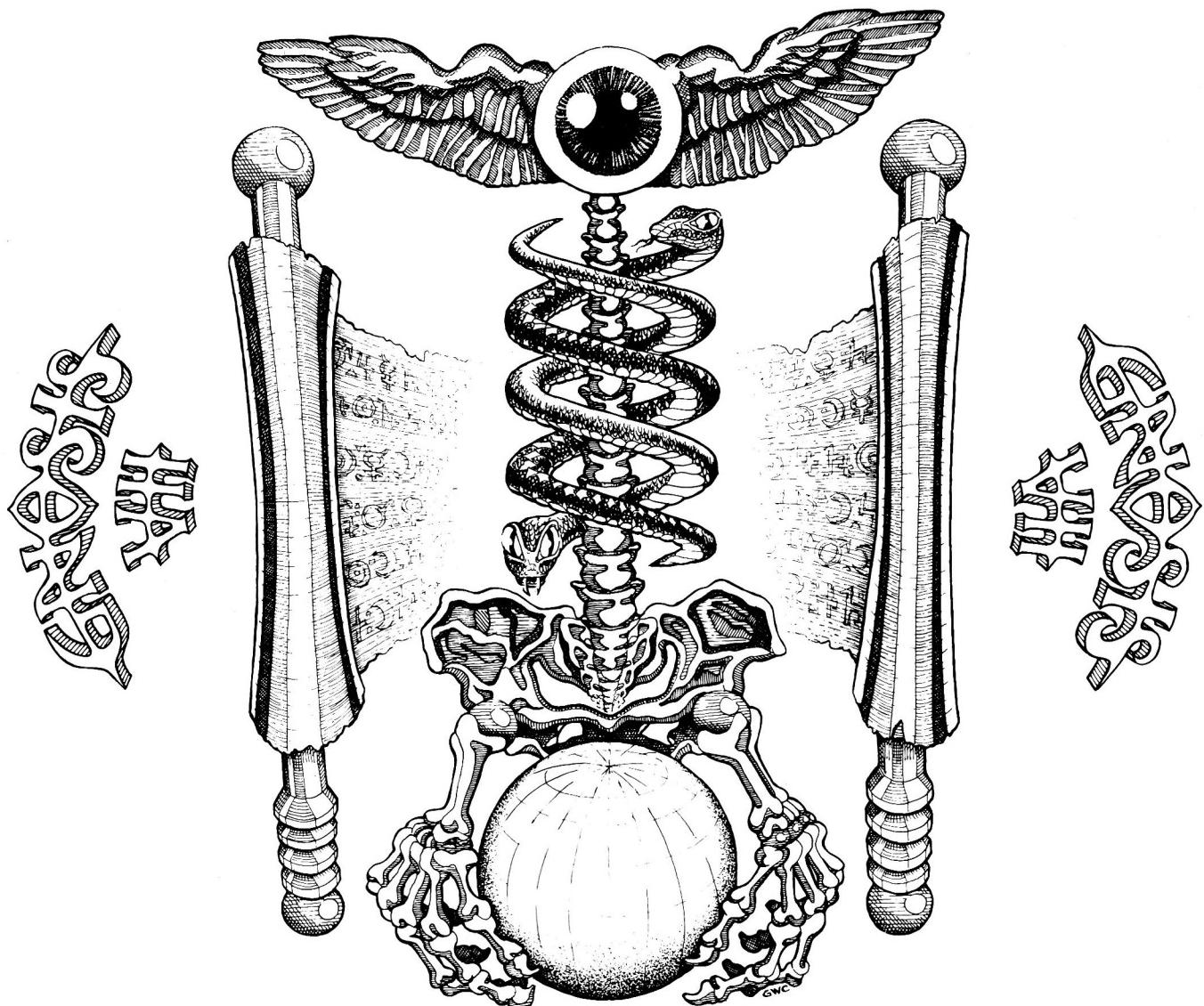
The T/S list contains the locations, in sequence, of each track and sector of each data sector which the file occupies. Since each file must have at least one T/S list and will occupy at least one data sector, each file on the disk will take at least two sectors. (To prove this, enter *NEW*. Then, without entering any program lines, enter *SAVE TEST*. You have now saved a program with no lines. Enter *CATALOG*. The catalog data for *TEST* will be 002, two sectors.)

Data

The file, whether a program or a text file, is stored in data sectors. If data occupies only part of a sector, the entire sector will be reserved for that program. Thus, a sector may contain one valid character and 255 blanks. Since our purpose is to study text files, let's examine the data sector in more detail.

Anatomy of a Data Sector

Each disk sector contains about 400 bytes. Those bytes contain 256 bytes of data and various other information that help the computer protect the integrity of the data. Figure 2 represents



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a data sector. It contains four components: *medium gap*, *address field*, *small gap* and *data field*.

Medium Gap

This is a medium gap, the kind which begins each sector. Note: for sector 0, this would be a large gap. Obviously, each sector would be followed immediately by the starting gap for the next sector. Sector 15 would be followed by a large gap, which marks the beginning of sector 0.

Address Field

The purpose of this information is to reassure the computer that it is reading the right data. Often when you first start your disk drive, you will hear it chatter. What has happened is the computer has discovered the disk drive is not reading the track the computer thinks it is, so DOS recalibrates the read/write head by driving it all the way to track 0, and then moves it to track 17 and begins the read/write process again. The address field for each sector contains:

- A *prologue*. This series of three unique bytes identifies an address field.
- The *disk volume*. These two bytes correspond to the "V" parameter in DOS commands (see page 23 of *The DOS Manual*). If you do not specify a disk volume, it will contain the value 254.

- The *track address*. This constitutes two bytes containing the number of the current track.

- The *sector number*. This constitutes two bytes containing the number of the current sector.

- A *check sum*. This constitutes two bytes derived from a comparison of the first three bytes (EOR in 6502 operation code—see any book on Apple machine language). This sum verifies the integrity of the information.

- An *epilogue*. This series of three unique bytes identifies the end of the address or data field.

Small Gap

This small gap assures that the computer is still "in sync" before it begins to read the data field.

Data Field

The data field contains 256 bytes of data. It has four components:

- A *prologue*. This constitutes three unique bytes (*different* from the prologue for the address field) which identify the beginning of a data field.
- The *data* being stored, which in our discussion will be a "text file."
- A *check sum*. This is the sum of all the bytes of data, used to verify the integrity of the data when it is re-read by DOS.
- An *epilogue*. This is the same unique

series of three bytes that marks the end of the address field.

Disk Space Assignment

Now that you've seen the kinds of information stored on a disk, examine a map of the disk to see where this information is stored. Figure 3 depicts the disk surface laid flat, in a manner similar to the way a typical wall map (Mercator projection) shows the Earth's surface. DOS occupies tracks 0-2 and the directory track 17. This leaves 32 tracks for storing data. DOS uses these tracks in a specific order. Let's imagine that we have two files to save to the disk:

Sample 1—a 2000-byte Applesoft program.
Sample 2—a 5000-byte text file.

When we save Sample 1 to a blank, initialized disk, DOS will begin with track 18. It assigns sector 0 as the Track/Sector list for this program and saves the program in sectors 1-9 ($2000/256 = 7.8$ or 8 sectors). DOS will leave sectors 10-15 blank.

If we now write Sample 2 to our disk, DOS will start with track 19, even though track 18 is not yet full, assigning sector 0 as the Track/Sector list. Since this file will occupy 20 sectors ($5000/256 = 19.5$), it will not fit in the remaining space in track 19. DOS will write the first part of the file to sectors 1-15 of track 19 and the remainder to sectors 0-4 of track 20, leaving the remaining sectors blank.

The next program or file would begin in track 21 and so forth until DOS reaches track 35. DOS then jumps to track 3 and continues similarly until it reaches track 16. At this point, at least sector 0 of all available data tracks is occupied, but a large number of the other sectors remain blank. DOS begins to "fill in" blank sectors, beginning again at track 18 (in the example above, starting with sector 10, just above Sample 1).

Using this method, the earliest data saved to the disk is stored contiguously, while data stored later is scattered. As you change the length of files, they tend to get "chopped up" as DOS looks for spare space on the disk. This does not affect the operation of your programs, except that the disk drive will "chunk" more as it moves the read/

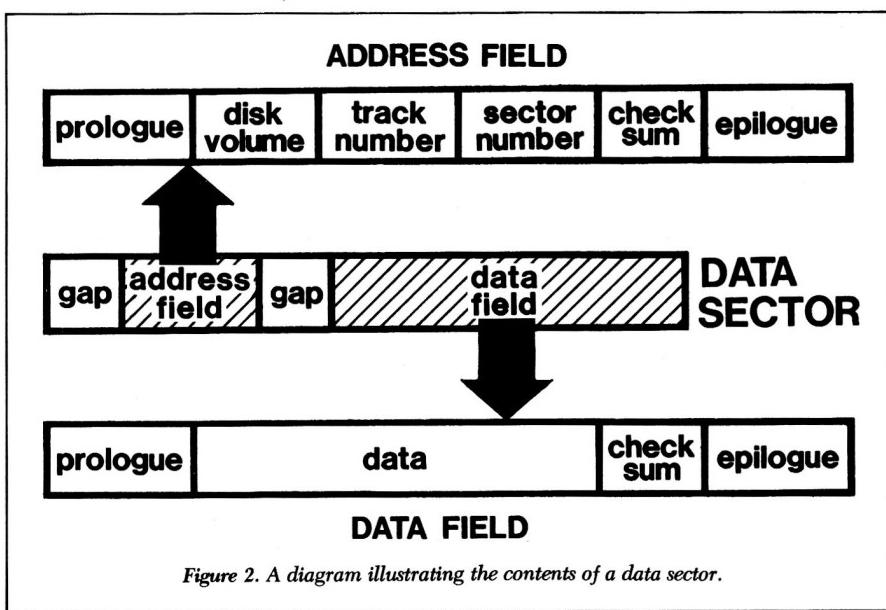


Figure 2. A diagram illustrating the contents of a data sector.

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write head back and forth to find bits and pieces of files.

Data Encoding

Now a quiz to see if you are paying attention: If one data field contains 256 bytes of text, how many bytes in a sector? If you answered "about 400" you must still be awake at this point. But why, you ask, does it take 400 bytes to store 256 bytes? The answer is "6 and 2." When data is written from the computer to the disk, it is encoded. (Agent 007?) Intelligence agencies encode data so that unauthorized persons cannot understand it (they use computers for that function, of course). Actually, DOS encodes data so that it can be better understood.

The Apple II and IIe hardware will read only a limited range of byte values from the disk (64 out of a possible 256). The most significant bit must always be "high" (one) and there may be only one pair of consecutive zero bits in each byte. This limits the number of usable bits in each byte of data to six. Thus, in order to store data on a disk, DOS must split up the bytes and encode them. DOS performs two types of

encoding: odd/even and prenibblizing.

Odd/Even Encoding

This is the type of encoding used for the address fields. Each byte of data in the computer is split into two pieces and stored in two separate bytes on the disk. The pattern for these two bytes is as follows:

1X1X1X1X
1Y1Y1Y1Y

The first byte contains the odd-numbered bits (7, 5, 3, 1—represented by X) and the second the even-numbered bits (6, 4, 2, 0—represented by Y). The ones are fillers. Obviously, when DOS re-reads the data, it discards the fillers and recombines the two bytes into one (it ANDs the two bytes, as seen in any book on Apple machine language).

If all the information on the disk were encoded using this technique, each sector would contain 512 bytes in the data field alone, allowing only ten sectors or about 90K (10 times 35 times 256) bytes of data per disk. But DOS 3.3 will accommodate over 126K (16 times 35 times 256) bytes of data per

disk. This is because the Apple II and IIe do not use the odd/even schema for encoding the data field.

Prenibblizing

Now let's look at the second type of encoding—prenibblizing. This kind of "nibble" has nothing to do with an apple. A nibble, quite appropriately, is part of a byte (computer engineers have a sense of humor after all!). Usually a nibble is four bits, but in the case of prenibblizing, a nibble is either two bits or six bits. The third through eighth bits of each byte of data in the computer are stored in one byte of the data field, padded with zeros. The remaining two bytes are stored in another byte. In this manner, 256 bytes of data in the computer are stored in 342 bytes of space on the disk. The pattern for this "6 and 2" encoding is as follows:

00XXXXXX (first byte in data block)

00YYYYYY

00ZZZZZZ

000000ZZ

000000YY

000000XX (last byte in data block)

The X above represents bits from the same byte. Of course, as the computer reads the data, DOS reconstructs the bytes.

The 400 bytes in a sector, then, are composed of 14 bytes in the address field plus 349 bytes in the data field plus 20 or 30 bytes in two gaps. If you have read this three times and are still confused, don't despair. Let it suffice to say that it works.

Further Reading

The Compleat Text File Primer is a synopsis of the information available on Apple text files. Appendix C of *The DOS Manual* (by Apple Computer) and Chapters 3 and 4 of *Beneath Apple DOS* (by Quality Software) provide additional information on disk format.

More to Come...

In Part 2, I will examine how text files are moved from memory to disk and how text is handled inside the Apple's memory. Until then, hasta la disk! ■

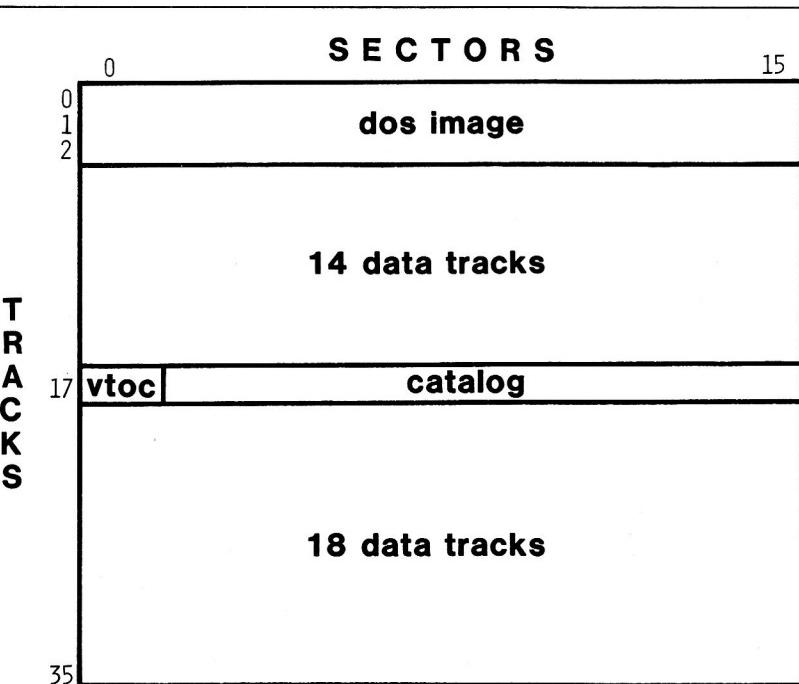
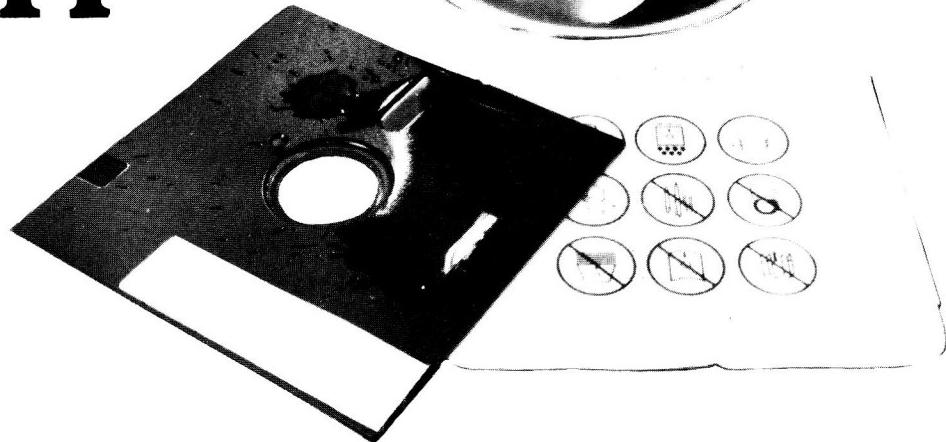


Figure 3. A map of a disk, indicating the location of VTOC, the catalog, DOS and the data tracks.

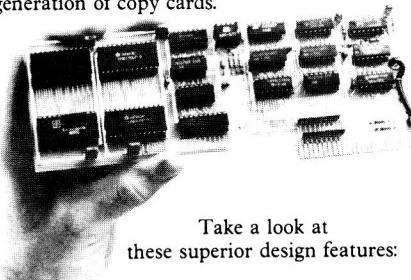
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Making Your Pascal Apple Grow



—by James R. Florini—

Let's face it right here at the beginning; I'm prejudiced. Not, I hope, in matters of race, sex, or religion, but certainly in the choice of computer languages. As far as I am concerned, Basic is really suitable only for short programs to be used rather briefly. Pascal is far preferable for the much longer programs I have developed for my laboratory and writing; these will be used and repeatedly upgraded for a long time. It is much easier to go back after a year or two and update a program in Pascal. Furthermore, Pascal programs run a good deal faster, and it is possible for a 64K Apple II to be made to act as if it were a larger computer when certain features of UCSD Pascal are utilized.

This last point is important, but it is hard to find the necessary information. For Basic, there are some useful hints in the *Applesoft Reference Manual* on how to conserve memory and speed up program execution (using multiple statements per line, removing REM statements, using integer rather than real arrays, and so on), but I have found no similar gathering of hints for the Pascal systems. Some hints can be found in the main parts of the Pascal manuals, others in the addenda and

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Figure.

Program using SIZEOF to determine how much memory a variable will use.

update included in the Pascal 1.1 package, and still others in published programs. Many of us start programming with Basic and then work our way into Pascal; many of these Pascal features have no parallel in Applesoft, and it takes a while for us to become aware of them. To make things easier for people just getting beyond the beginning stage in Pascal (and perhaps encourage others to look into the powerful UCSD operating system included with Apple Pascal), this article presents some of the approaches I have picked up during three years of learning about the system; taken together, they make the Apple II (and the IIe, of course) a more impressive machine.

Memory Measurement Techniques

How can we determine which parts of the program are most responsible for the memory problems that occur? I have found three ways to do this:

1. Use of the compiler listing option. If you insert (*\$L PRINTER:*) at the beginning of your program, you will get a printed listing with some very useful information as the program is compiled. If you have a printer capable of compressed print or some other method for getting longer lines, it is a good idea to set that first. For my MX-80, the following program gives a convenient print format with no annoying wraparound:

```
(*$L PRINTER:*)
(*Might as well try this out right now*)
PROGRAM SETCOMPRESSED;
VAR PRINTER: TEXT;
BEGIN
  REWRITE(PRINTER,PRINTER:);
  WRITE (PRINTER, CHR(15));
END.
```

Under this listing option, the program is printed out as it is compiled, and each line is preceded by four columns of numbers: the line number (nice, but not really important), the segment number (more on segments later), a double column indicating procedure number and lexical (or nesting) level, and byte number within the procedure (which can be very handy in chasing down run-time errors). This last one gives the information we want here; as each line is listed, the number of 2-byte words (for declarations) or

```
PROGRAM TESTTHINGS;
VAR BIG: PACKED ARRAY[0..99] OF INTEGER;
  BIGGER: ARRAY[0..99] OF INTEGER;
  SMALLSTRING: PACKED ARRAY[0..99] OF STRING[40];
  BIGSTRING: PACKED ARRAY[0..99] OF STRING;
  NOTPACKED: ARRAY[0..99] OF STRING;
BEGIN
  WRITELN('THE BIG ARRAY TAKES ',SIZEOF(BIG),' BYTES.');
  WRITELN('THE BIGGER ARRAY TAKES ',SIZEOF(BIGGER),' BYTES.');
  WRITELN('THE SMALL STRING TAKES ',SIZEOF(SMALLSTRING),' BYTES.');
  WRITELN('THE BIG STRING TAKES ',SIZEOF(BIGSTRING),' BYTES.');
  WRITELN('NOT PACKED, THE STRING TAKES ',SIZEOF(NOTPACKED),' BYTES.');
END.
```

bytes (for instructions) used up to that point in the procedure is indicated. Multiply the numbers in the declaration parts by two to get the number of bytes used by those variables. The difference between two lines indicates the number of bytes devoted to whatever is happening in that line. For example, if you declare a variable:

```
PICTURE: FILE OF PACKED ARRAY[0...8191] OF 1... 255;
```

you will find that it takes 4396 words (or 8792 bytes) to store the contents of the graphics screen.

This approach is also handy the first few times through a long and complex program. Just press the spacebar several times as the compiler starts, and all compiler errors (with the error number) will be printed as they are detected. You can go away while all of this is happening, and then go over the printout in your easy chair, using pages 137-140 of the *Language Reference Manual* to get some idea of what went wrong. It's a lot better than going back and correcting each error as it is detected.

2. The MEMAVAIL function returns the number of 16-bit words currently available between the top (or bottom, if you prefer to be logical) of the program stack and top of the data heap—roughly the amount of memory available, not considering the graphics pages. This is similar to the Applesoft FRE function, except that the latter gives its results in bytes rather than words. I like to include a MEMAVAIL call (WRITELN ('MEMORY AVAILABLE IS ', MEMAVAIL,' WORDS.')) every time I clear the screen in a program, so I can see what is happening as it runs. After a while of this kind of thing, you get a pretty good idea of how much memory is being used by various procedures, functions, units, etc.

3. The SIZEOF function returns the

number of bytes occupied by a specified variable; this is most often used with the low-level intrinsics in advanced programs, but it is also a handy way to find out how much space an array, record, or any other kind of declared variable may be using. Using it, you can determine the amount of memory a variable will use before you write the main program by first writing an analytical program like the one in the Figure.

These three approaches can give you some useful information when a program is bursting at the seams, and you have to make hard choices about what to remove or compress. When problems arise, it is useful to know just what is eating up memory. Writing this article prompted me to look at memory utilization in more detail, and I was surprised to find that packing doesn't make as much difference as I had expected; here are the results obtained with a program similar to that in the Figure.

	BYTES OF MEMORY USED BY A 100-ELEMENT ARRAY	PACKED	NOT PACKED
STRING[40]	4200	4200	
CHAR	100	200	
INTEGER	200	200	
REAL	400	400	
BOOLEAN	14	200	

If SIZEOF is giving correct results, the only arrays worth packing are those containing CHAR and BOOLEAN variables. I'd be interested in hearing comments on this from others more knowledgeable about the inner workings of the UCSD system.

Memory Conservation in Simple Programs

Generally, relatively simple programs don't present memory problems unless they use large arrays, lots of strings, or employ big library units like

Turtlegraphics. If arrays of numerical variables or a long set of instructions must be global (i.e., you can't swap them out of memory by using segment procedures as described below), it may be possible to store and retrieve the data from diskette. For example, XY data can be stored as a series of records on diskette, rather than as a two-dimensional array of REALs in memory. The two structures below give identical storage of data, but the RECORD uses up less computer memory.

```
VAR DATA: PACKED ARRAY[0..1000,0..1] OF REAL;
```

can also be stored as:

```
TYPE DATAREC = RECORD  
    X,Y: REAL;  
END;  
VAR DATA: FILE OF DATAREC;
```

By this procedure, you replace the 8008 bytes that the DATA array would use with 16 blocks of diskette space and 608 bytes in the program for the DATA file. Of course, this saving in memory comes at a considerable sacrifice in speed; all the SEEKS, PUTS, and GETs necessary to store and retrieve the data will keep the disk drive spinning. Nevertheless, this memory conservation can make the difference between a workable program and one that just won't fit the Apple. The new pseudo-disks (such as the Saturn 128K RAM card I use) let one have the best of both worlds; the array can be stored on the pseudo-disk, but elements can be accessed almost as rapidly as if they were in main memory.

As the SIZEOF tests above showed, arrays of strings take up lots of memory. However, I was surprised recently to discover that it is less memory-demanding to store and sort a list of strings (for example, a list of authors) as an array rather than as a binary tree; apparently the pointer variables required for the latter take up substantial memory in addition to that required for the strings themselves. For a direct comparison, I wrote a little program that compared the memory available (using MEMAVAIL) before and after sorting a file of 100 strings (each 40 characters in length); it showed 5160 bytes used for the binary tree, while only 4200 bytes were used for the corresponding ARRAY [1..100] OF

STRING[40]. Thus the tree took almost 25 percent more memory. It is faster, but at a price.

Including Additional Textfiles in Programs

Compared to Basic, Pascal is particularly good for large, complex programs. Unexpected "side effects" between different parts of the program are made much less likely by the availability of local variables and longer variable names (eight characters are significant in Pascal, compared to two

processed. There is a way around this, too. After everything is ready, save the main program file to disk, use N)EW in the filer to remove SYSTEM.WRK.TEXT, and compile the primary file by specifying the file on disk when the C)OMPILE command results in the "Compile what file?" prompt. The only problem now is that you have to figure out what file was being processed and then enter the correct filename when going back to the editor after a compiler error is found. For a long program, the compiler listing option described earlier is a lot easier to use, but this is a good way to remove those last few errors.

Segment Procedures

Of course, if you include enough of these long textfiles in your program, the resultant codefile will eventually exceed the capacity of the Apple, so you'll get a "Stack Overflow" or similar cheery message. There are some things to do about this, too.

The most useful approach is to use segment procedures and functions. These structures swap in an out-of-memory whenever they are used, and they take all their local variables with them. This "overlaying" technique makes it possible to write a small driving program which does nothing but call a series of segment procedures, each of which is nearly large enough to saturate the Apple all by itself. That's a little extreme; under such circumstances, it would seem logical to write a series of separate programs and use the SETCHAIN procedure in the CHAIN-STUFF library unit (page 2 of the addendum to the *Language Reference Manual*) to run them.

Nevertheless, it is a very useful technique to minimize the number of global variables and procedures, and divide a long program into a series of nearly independent segment procedures. According to the *Language Reference Manual* addendum, a program can contain as many as 16 segment procedures and functions, as well as intrinsic units (from SYSTEM.LIBRARY). That combination can allow some really large programs!

The Swapping Option

This option (described on pages 7-9 of the addendum to the *Operating Sys-*

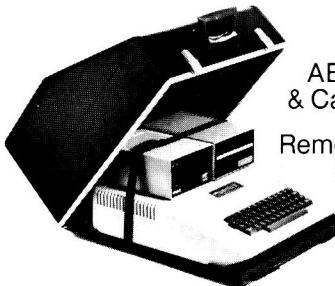
**"Compared to Basic,
Pascal is particularly good for
large, complex programs."**

in Applesoft). Furthermore, the textfiles to be compiled can be much larger than the Apple memory. I have one graphing and calculating program that is about 40 typewritten pages long, and compiles to a codefile 51 blocks in length; longer ones would be quite possible.

The UCSD system offers the Include-file compiler directive to make this work. By simply including (*\$I #5: part2*) in the textfile, you can have the compiler switch from the primary textfile to one on the diskette in drive #2 labeled PART2.TEXT. All include-files must be specified by the main textfile (you can't "nest" them), but otherwise there seem to be no restrictions. I have included as many as five outside files, and the manuals suggest that the only limitation is the number of textfiles you can squeeze on the disk drives you have, while still having space to store the resultant codefile. Insofar as I know, Applesoft offers nothing comparable to this.

The only disadvantage I have noticed is that the editor doesn't put the cursor at the place a compiler error was detected if an include-file is being

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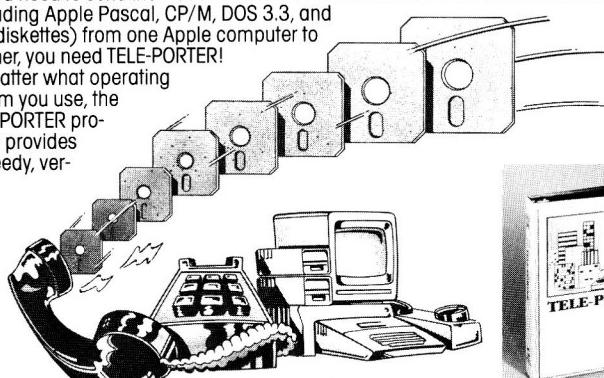
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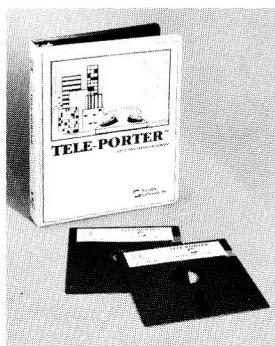
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tem Reference Manual) makes a direct trade-off between available space and execution speed; by taking part of the operating system out of memory, it makes an additional 2200 bytes of memory available. I have several programs that bomb when swapping is off, but run fine with swapping on. The swapping option can be set from the main command line (by pressing S followed by Y if swapping is off—the default condition) or by using the SWAPON procedure when chaining programs. Insofar as I know, there is no way of turning it on within a single program. Does anybody know of a poke that will do this?

The Noload Compiler Option

If you have done much programming with Turtlegraphics, you have learned that that unit takes up a lot of memory, and the presence of the hires graphics pages right in the middle

of memory doesn't help, either. In several of my data-plotting programs, I have solved memory problems by using the Noload and Resident compiler options (pages 66–67 in the *Language Reference Manual*) to keep Turtlegraphics out of memory during all the data-entering, checking, and printing parts of the program, and then keeping it in memory during the plotting parts. To do this, you enter (*\$N+) at the beginning of the main program body, and (*\$R TURTLEGRAPHICS*) at the beginning of any segment procedures that use Turtlegraphics. Assuming that the data are stored on a diskfile as described above, this allows you to plot a lot of data without exceeding the Apple's 64K. Of course, there are ways to increase that 64K, too.

Expansion RAM Cards and Hard Disks

Everything mentioned above can be done with existing equipment and

techniques; all you need do is apply your brain. However, there are some ways of expanding the Apple that require application of your pocketbook. My favorite is the pseudodisk, which has begun to appear in substantial numbers in the Apple add-on market. I use the Saturn 128K card. Most pseudodisks cost a bit more than a disk drive, and 128K (224 blocks) is somewhat less than the 143K (280 blocks) stored on the standard Apple diskette. But they are much faster and more useful than a third disk drive would be.

With the Saturn card, I have arranged my system (using the Filemove utility supplied with the Saturn system) so the editor, compiler, and filer are all stored in the RAM card. This leaves 68 blocks free in the pseudodisk, so it is possible to edit and compile most programs directly from and to the pseudodisk with no whirring of diskettes and with much greater speed than is usually the case. The differences in speed are in human-recognizable time (minutes), not in the microseconds which impress computer buffs but don't really matter to us people. For example, compiling time for one of my big programs was reduced from over thirteen minutes to less than five minutes using the arrangement described here. I've tried all of this on a IIe, and everything works just the same as on my II Plus.

When datafiles are stored on an expansion RAM card rather than on diskette, access speed improves. Particularly if a large series of records is to be searched in sequence (as in forming an alphabetized list of authors, for instance), the RAM pseudodisk completes the job much faster and more quietly than a regular diskette can.

Today's ultimate in speed and capacity is the hard disk. In this case, the usual trade-off of execution speed for memory capacity is not imposed to the extent that is true in most of the approaches described above; this time it is simply a matter of money—rather a lot of it. But prices are coming down.

If you have additional ideas, send a letter to the editor describing them; let's exchange views and approaches in this area! ■

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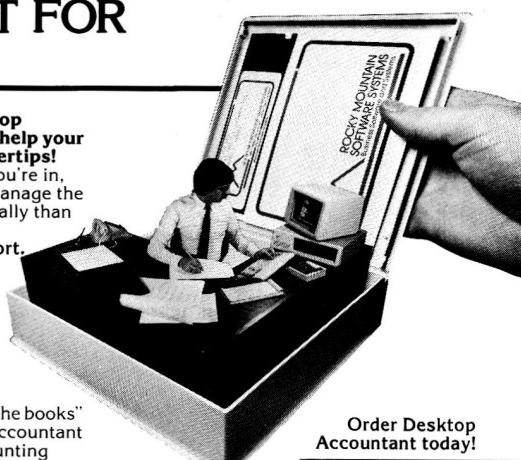
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Pretty-Printing from Word Processors

by Susan W. Rollinson

I have seen several programs in magazines that "pretty print" program listings. Most of them are quite lengthy and slow down the printing process considerably as they parse each word. Actually, a much simpler solution exists if you have a word processor that accepts normal DOS text files (e.g., Applewriter).

First, you must capture your pro-

gram listing in a text file (see p. 76 in the *Apple DOS Manual*). This text file is then used with all the usual goodies of your word processor: margin controls, skip over perforation, page numbering, top line titling, special printer commands, or whatever. With Applewriter II, I like to use a left margin of 9 to allow room for punching holes, and a paragraph margin of -5 for indentation of any

wraparound on the line.

This method does not allow for automatic indentation of FOR-NEXT loops or putting each command on its own line. You could, of course, use the text editing features to make these modifications manually. ■

You can write to Susan W. Rollinson at 849 Lou Ave., Clifton Forge, VA 24422.

Byte Seeking

by H. Z. Hurlburt

The MLSEEK program shown in the program listing permits you to locate the address of one, two or three consecutive bytes anywhere in memory. The program is useful for unravelling and debugging machine-language programs. Suppose, for example, that you have isolated a bug in a subroutine which begins at \$6032. Using MLSEEK, you can discover where this subroutine is called from the main program and how control is passed back to the program. Here are the steps:

- In \$F9 and \$FA store the address at which your search is to begin, high byte first.
- In \$FB store the number of consecutive bytes (1, 2, or 3) that you are searching for.
- In \$FC, \$FD, and \$FE store the bytes themselves. Use \$FC if only one byte is sought, \$FC and \$FD if only two bytes are sought.

Now, if the main program begins at \$5000 and you want to find all subroutine calls to \$6032, type (from the monitor) F9:50 00 03 20 32 60 and then 300G to run MLSEEK. This example assumes that the program you are debugging begins at \$5000 and that MLSEEK has been loaded at \$300.

The program will respond with the addresses where the sequence of 20 32 60 can be found. If this draws a blank, you could try other byte combinations such as 4C 32 60, 6C 32 60, or just 32 60. You might get a lot of responses to that last combination!

To minimize data entry, an end-of-search parameter is not used. The program searches from the user-defined starting point all the way up to \$FFFF, avoiding page \$C000 to avoid setting softswitches. It is so fast, however, that the search only takes a few seconds. Good hunting! ■

You can write H. Z. Hurlburt at 7814 Santa Elena, Houston, TX 77061.

Program listing, MLSEEK.

0300-	A2 00	LDX	#\$00
0302-	A5 F9	LDA	\$F9
0304-	85 1C	STA	\$1C
0306-	A5 FA	LDA	\$FA
0308-	85 1B	STA	\$1B
030A-	A5 FB	LDA	\$FB
030C-	C9 03	CMP	#\$03
030E-	D0 03	BNE	\$0313
0310-	4C 51 03	JMP	\$0351
0312-	C9 02	CMP	#\$02
0315-	D0 03	BNE	\$031A
0317-	4C 31 03	JMP	\$0331
031A-	A1 1B	LDA	(\$1B,X)
031C-	C5 FC	CMP	\$FC
031E-	D0 0B	BNE	\$032B
0320-	A5 1B	LDA	\$1B
0322-	85 1F	STA	\$1F
0324-	A5 1C	LDA	\$1C
0326-	85 1E	STA	\$1E
0328-	20 7A 03	JSR	\$037A
032B-	20 8A 03	JSR	\$038A
032E-	4C 1A 03	JMP	\$031A

Listing continued.

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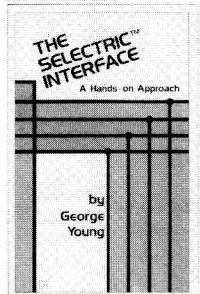


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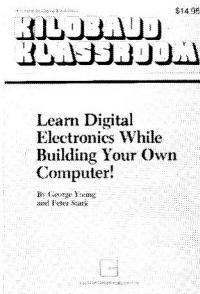
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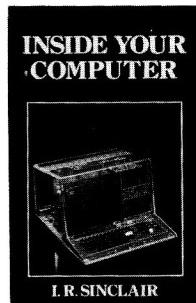
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Listing continued.

0331-	A1 1B	LDA	(\$1B,X)	0359-	85 1F	STA	\$1F	0384-	A9 A0	LDA	#\$A0
0333-	C5 FC	CMP	\$FC	035B-	A5 1C	LDA	\$1C	0386-	20 ED FD	JSR	\$FD
0335-	D0 14	BNE	\$034B	035D-	85 1E	STA	\$1E	0389-	60	RTS	
0337-	A5 1B	LDA	\$1B	035F-	20 8A 03	JSR	\$038A	038A-	E6 1B	INC	\$1B
0339-	85 1F	STA	\$1F	0362-	A1 1B	LDA	(\$1B,X)	038C-	D0 02	BNE	\$0390
033B-	A5 1C	LDA	\$1C	0364-	C5 FD	CMP	\$FD	038E-	E6 1C	INC	\$1C
033D-	85 1E	STA	\$1E	0366-	D0 0C	BNE	\$0374	0390-	A5 1C	LDA	\$1C
033F-	20 8A 03	JSR	\$038A	0368-	20 8A 03	JSR	\$038A	0392-	C9 C0	CMP	#\$C0
0342-	A1 1B	LDA	(\$1B,X)	036B-	A1 1B	LDA	(\$1B,X)	0394-	D0 02	BNE	\$0398
0344-	C5 FD	CMP	\$FD	036D-	C5 FE	CMP	\$FE	0396-	E6 1C	INC	\$1C
0346-	D0 03	BNE	\$034B	036F-	D0 03	BNE	\$0374	0398-	A5 1C	LDA	\$1C
0348-	20 7A 03	JSR	\$037A	0371-	20 7A 03	JSR	\$037A	039A-	D0 09	BNE	\$03A5
034B-	20 8A 03	JSR	\$038A	0374-	20 8A 03	JSR	\$038A	039C-	A5 1B	LDA	\$1B
034E-	4C 31 03	JMP	\$0331	0377-	4C 51 03	JMP	\$0351	039E-	D0 05	BNE	\$03A5
0351-	A1 1B	LDA	(\$1B,X)	037A-	A5 1E	LDA	\$1E	03A0-	68	PLA	
0353-	C5 FC	CMP	\$FC	037C-	20 DA FD	JSR	\$FDDA	03A1-	68	PLA	
0355-	D0 1D	BNE	\$0374	037F-	A5 1F	LDA	\$1F	03A2-	4C 59 FF	JMP	\$\$FF59
0357-	A5 1B	LDA	\$1B	0381-	20 DA FD	JSR	\$FDDA	03A5-	60	RTS	

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DB Master Util Pack 1 or 2	99.00	69.50
DB Master Version 4	350.00	247.70
Dow Jones Market Analyzer	350.00	293.75
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SHAPE EDITOR: Keyboard-draw hi-res shapes for animation in your Applesoft programs. Access & create proportionally-spaced hi-res Typefaces with each character re-definable as you want. Six fonts are included on the disk. Excellent LISTable Applesoft demos show you how to animate graphics and create professional-looking Charts and Graphs.

BYTE-ZAP: Rewrite any byte on a disk for repair or alteration. Load entire sectors on the screen for inspection. Hex/Dec/Ascii displays and input. Educational experiments included for making trick file names, restoring deleted files, changing DOS, etc.

MORE: Useful music, text and hi-res tricks for your programs. Clear educational documentation.

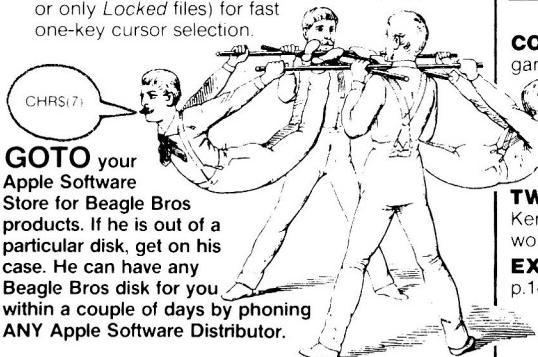
APPLE MECHANIC TYPEFACES

by BERT KERSEY

\$20.00: Includes Peeks & Pokes Chart.

26 NEW FONTS for use with Apple Mechanic programs. Many different sizes and typestyles, both ordinary and artistic. Every character—from A to Z to "★" to "□"—of every typeface—from "Ace" to "Zooloo"—is re-definable to suit your needs. All typefaces are proportionally spaced for a more professional appearance. People do notice the difference!

BEAGLE MENU: Display only the file names you want from your disks (for example, only Applesoft or only Locked files) for fast one-key cursor selection.



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<input type="checkbox"/> DiskQuik	29.50	<input type="checkbox"/> Utility City	29.50
<input type="checkbox"/> DOS Boss	24.00	<input type="checkbox"/>	
<input type="checkbox"/> Double-Take	34.95	<input type="checkbox"/> ADD ME to mailing list.	
<input type="checkbox"/> Flex Type	29.50	<input type="checkbox"/> ALREADY ON mail list.	

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RENAME DOS COMMANDS & Error Messages—"Catalog" can be "Cat"; "Syntax Error" can be "Oops" or almost anything you want it to be.

PROTECT YOUR PROGRAMS. An unauthorized Save-attempt can produce a "Not Copyable" message, or any message you want. Also easy List-Prevention and other useful Apple tips and tricks. Plus one-key program-execution from catalog.

CUSTOMIZE DOS. Change the catalog Disk Volume heading to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips and educational Apple experiments.

ANYONE USING YOUR DISKS (booted or not) will be using DOS the way YOU designed it.



10 LIST: LIST: LIST: FOR ZZ_PEEK(175)+PEEK
(176)*256+36 TO 3072: POKE ZZ.216: NEXT
20 FOR XXX 1 TO 2: POKE-16299.0: POKE
-16300.0: XXX-1: NEXT: REM Experiment
with different length variable names.

BEAGLE BAG

12 APPLE GAMES ON ONE DISK

by BERT KERSEY

\$29.50: Includes Peeks & Pokes Chart

COMPARE BEAGLE BAG with any single-Gamed Locked-Up disk on the market today.

All 12 games are a blast, the price is a bargain, the instructions are crystal clear, and the disk is COPYABLE. You can even change the programs or list them to learn programming tricks by seeing how they work.

TWELVE GAMES from the Applesoft Ace, Bert Kersey—TextTrain, Wowzo, Magic Pack, Buzzword, Slippy Digits, and many many more...

EXCELLENT REVIEWS—See Jan-83 Softalk, p.148. Beagle Menu too: see Typefaces description.

NEW! SILICON SALAD INCLUDING TIP DISK #2

by BERT KERSEY and MARK SIMONSEN

\$24.95: Includes Peeks/Pokes AND Commands Charts

MANY MINI-UTILITIES: Disk Scanner finds bad disk sectors. Key-Clicker adds subtle sound as you type. DOS-Killer adds two tracks of space to your disks. 2-Track Cat allows up to 210 file names per disk. Program Splitter makes room for hi-res pix with large Applesoft programs. Text Imprinter transfers text to the hi-res screen. Onerr Tell Me prints the appropriate error message but continues program execution. Text Screen Formatter converts text layouts into Print statements... plus much more Apple wizardry from the boys at Beagle Bros.

MORE TIPS ON DISK: Including fantastic programming tricks from Beagle Bros Tip Books 5, 6, and 7, plus programs from Tips/Tricks Chart #1.

TWO-LINERS TOO: From our customers around the world—and elsewhere. Little mind-blowers that will teach your old Apple some new tricks!

TIP DISK #1

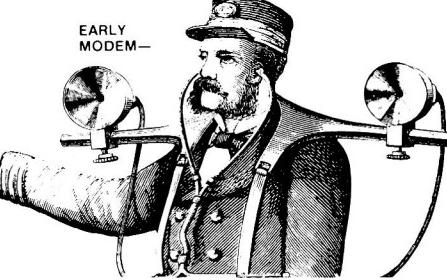
100 TIP BOOK TIPS ON DISK
by BERT KERSEY

\$20.00: Includes Peeks & Pokes Chart.

100 LISTABLE PROGRAMS from Beagle Bros Tip Books 1-4. Make your Apple do things it's never done! All 100 programs are LISTable and changeable for Apple experimentation.

COMMAND CHART INCLUDED: Free with each Tip Disk: an 11 x 17 poster of all Applesoft, Integer Basic & DOS Commands with Descriptions!

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VARIABLE-WIDTH HI-RES TEXT UTILITY

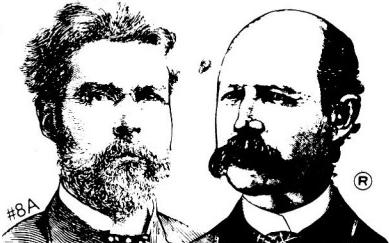
by MARK SIMONSEN

\$29.50: Includes Peeks & Pokes Chart

PRINT VARIABLE-WIDTH TEXT on both hi-res screens with normal Applesoft commands (including HTAB 1-70). Normal, expanded & compressed text with no extra hardware. (70-column text requires a monochrome monitor, not a tv).

ADD GRAPHICS TO TEXT or add Text to hi-res graphics. Run your existing Applesoft programs under Flex Type control. Fast, easy to use, and Compatible with GPLE and Double-Take.

DOS TOOL KIT font compatibility, or use the supplied Flex Type typefaces. Select up to 9 fonts with control-key commands. A text character editor lets you redesign any Apple text character.



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*DISKQUIK requires Apple Ile.

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FRAME-UP

FAST APPLE DISPLAY UTILITY
by TOM WEISCHAAR

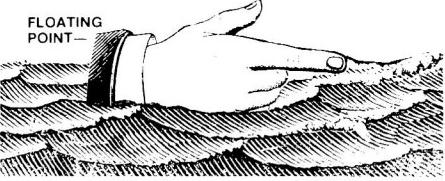
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PROFESSIONAL PRESENTATIONS: Turn your existing Hi-Res, Lo-Res and Text frames into attractive Apple "slide shows". FAST hi-res loads in 2½-seconds! Paddle or Keyboard-advance frames.

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NEW!**GLE**GLOBAL PROGRAM LINE EDITOR
by NEIL KONZEN

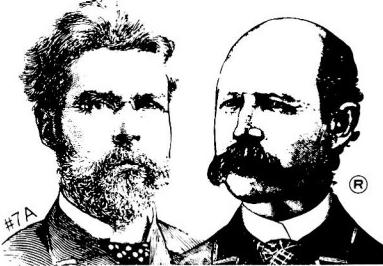
\$49.95: Includes Peeks/Pokes Chart & Tip Book #7.

A CLASSIC APPLE PROGRAM EDITOR
GLE lets you edit Applesoft program lines **FAST** without awkward cursor-tracing and "escape editing".**INSERT & DELETE:** GLE works like a word processor for Applesoft program lines. You make changes instantly by jumping the cursor to the change point and inserting or deleting text. No need to trace to the end of a line before hitting Return.**GLOBAL SEARCH & REPLACE:** Find any word or variable in your programs, **FAST**. For example, find all lines containing a GOSUB, or edit or delete all lines with REM statements, or all occurrences of any variable. Replace any variable, word or character with any other. For example, change all X's to ABC's, or all "Horse" strings to "Cow".**80-COLUMN COMPATIBILITY:** All edit & global features support Apple IIe 80-column cards and most 80-column cards on any Apple IIe, II+ or II.**DEFINABLE ESC FUNCTIONS:** Define ESC plus any key to perform any task. For example, ESC-1 can catalog drive 1. ESC-L can do a "HOME- LIST". ESC-N could type an entire subroutine... Anything you want, whenever you want.**GLE DOS MOVER:** Move DOS and GLE to Language Card (or IIe upper 16K) for an **EXTRA 10,000 Bytes** (10K) of programmable memory.**Plus APPLE TIP BOOK #7:** Learn more about your Apple! Includes all new GLE tips and tricks.**UTILITY CITY**
21 PROGRAMMING UTILITIES
by BERT KERSEY

\$29.50: Includes Peeks/Pokes Chart & Tip Book #3

LIST FORMATTER prints each program statement on a new line. Loops indented with printer Page Breaks. A great Applesoft program de-bugger.**MULTI-COLUMN CATALOGS**, with or without sector and file codes. Organize your disk library.**INVISIBLE** and trick catalog file names. Invisible functioning commands in Applesoft programs too.**MUCH MORE:** 21 utilities, including auto-post Run-number & Date in programs, alphabetize/store info on disk, convert dec to hex or Int to FP, protect and append programs, dump text to printer...**LEARN PROGRAMMING:** List-able programs and informative documentation. Includes Tip Book #3. Hours of good reading & Applesoft experiments.**ALPHA PLOT**
HI-RES GRAPHICS/TEXT UTILITY
by BERT KERSEY and JACK CASSIDY

\$39.50: Includes Peeks/Pokes Chart & Tip Book #4.

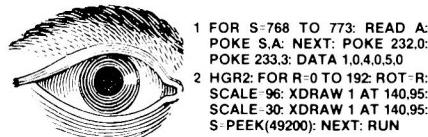
DRAW IN HI-RES on both Apple "pages" using easy keyboard commands OR paddles/joystick. Pre-view lines before plotting. Solid or mixed colors & Reverse (background-opposite) drawing. FAST one-keystroke circles, boxes & ellipses, filled or outlined. Add text for graphs & charts. All pix Save-able to disk, to be called from your Applesoft programs.**COMPRESS HI-RES DATA** to 1/3 disk space (average) allowing more hi-res pictures per disk.**MANIPULATE IMAGES:** Superimpose any two images, or RE-LOCATE any rectangular section of any drawing anywhere on either hi-res page.**HI-RES TYPE:** Add text to your pictures with adjustable character-size and large-character color. Type anywhere with no Htab/Vtab limits. Type sideways too, for graphs. Includes Tip Book #4.**Beagle Bros**
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619-296-6400**ALL BEAGLE DISKS ARE UNLOCKED, COPYABLE AND COMPATIBLE WITH APPLE II, II+ AND IIe.***
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BEAGLE BASIC
APPLESOFT ENHANCER
by MARK SIMONSEN\$34.95: Includes Peeks/Pokes Chart & Tip Book #6.
Requires Apple IIe (OR II/II+ with RAM Card).**RENAME ANY APPLESOFT COMMAND** or Error Message to anything you want. For program clarification, encryption/protection or even foreign translation. Plus add optional NEW COMMANDS:**ELSE** follows If-Then statements, like this:

IF X-2 THEN PRINT "YES": ELSE PRINT "NO"

HSCRN reads color of any hi-res dot for collision testing. **SWAP X,Y** exchanges 2 variables' values. New **TONE** command writes music with no messy pokes & calls. **SCRL** scrolls text in either direction. **TXT2** lets Text Page 2 act exactly like Page 1.**PLUS:** GOTO & GOSUB may precede variables, as in "GOSUB FIX" or "GOTO 4+X". Escape-mode indicated by special ESC CURSOR. Replace awkward Graphics screen-switch pokes with 1-word commands. Change ctrl-G Beep to any tone. **INVERSE REMS** too! All GLE compatible.**PRONTO-DOS**
HIGH-SPEED DOS / DOS-MOVE UTILITY
by TOM WEISHAAR

\$29.50: Includes Peeks & Pokes Chart

TRIPLES THE SPEED of disk access and frees 10,000 bytes of extra memory by moving DOS.**Function**BLOAD HI-RES IMAGE 10 sec. 3 sec.
LOAD 60-SECTOR PROGRAM 16 sec. 4 sec.
SAVE 60-SECTOR PROGRAM 24 sec. 9 sec.
BLOAD LANGUAGE CARD 13 sec. 4 sec.
(Text Files: No Change)**Normal Pronto**

Boot the Pronto disk or your updated disks, created with the normal INIT command. Compatible with all DOS Commands. GLE, Double-Take, DOS Boss, DiskQuik and almost all unprotected programs.

MOVE DOS to your Language Card, RAM Card, or standard Apple IIe upper 16K, freeing up **10,000 EXTRA BYTES** of memory for your programs.**15 EXTRA SECTORS** per disk. Catalog Free-Space displayed every time you catalog a disk.**TYPE-COMMAND** ("TYPE filename") prints contents of sequential Text Files on screen or printer.**NEW!****DISKQUIK**

DISK DRIVE EMULATOR

by HARRY BRUCE and GENE HITE

\$29.50: Includes Peeks & Pokes Chart
Requires Apple IIe with Extended 80-column Card.**ACTS LIKE A DISK DRIVE** in Slot 3, but much faster, quieter, more reliable and \$350+ cheaper! Enjoy the benefits of a 2nd (or 3rd or 4th...) drive at less than 1/10th the price. Catalogs normally with "CATALOG, S3" command. Load & Save any kind of files into RAM with normal DOS commands.**SILENT AND FAST:** Since no moving parts are involved, DiskQuik operates silently and at super-high speeds. See it to believe it. Your Apple IIe's Extended 80-column Card (required) can hold about half the amount of data as a 5 1/4" floppy disk!**MANY USES:** For example, auto-load often-used files like FID etc., etc., into RAM when you boot up, so they are always available when you need them. Copy files from RAM onto disk and vice versa, just as if a disk drive were connected to slot #3.**FRIENDLY & COMPATIBLE** with 80-column display. GLE, ProntoDOS, and all normal Applesoft and DOS commands and procedures. Will not interfere with Apple IIe "Double Hi-Res" graphics.**DOUBLE-TAKE**
2-WAY-SCROLL/MULTIPLE UTILITY
by MARK SIMONSEN

\$34.95: Includes Peeks/Pokes AND Tips/Tricks Charts.

2-WAY SCROLLING: Listings & Catalogs scroll Up AND Down, making file names and program lines much easier to access. Change the Catalog or List scroll-direction at will, with Apple's Arrow keys.**80-COLUMN COMPATIBLE:** All features support IIe and most other 80-column cards.**BETTER LIST FORMAT:** Each program statement lists on a new line for **FAST** program tracing & de-bugging. Printer-compatible; any column-width.**VARIABLE-DISPLAY:** Displays all of a program's strings and variables with current values.**CROSS-REFERENCE:** Sorts and displays line numbers where each variable & string appears.**AUTO-LINE-NUMBER:** Hex/Dec Converter, better Renumber/Append, Program Stats, Change Cursor, Space-On-Disk. GLE/Pronto compatible.

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The Interface Group Inc.

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(617) 449-6600

March 12–16

**IEEE International
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Robotics

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March 14–16

Simulation Symposium

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March 15–16

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March 24–26

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March 25–30

**International Conference
on Software Engineering**

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March 26–28

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Newark, DE

contact:

Dr. Richard B. Fischer
Division of Continuing Ed.
University of Delaware
Newark, DE 19716
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April 5–7

COMDEX/Winter

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April 9–12

IEEE INFOCOM '84

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April 14–15

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Trenton, NJ 08625
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April 25–27

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April 25–28

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April 26–29

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Workshop
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May 3-6
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May 5
Computer Conference
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May 7-11
Capitol-izing on
Computers in Education
Washington, DC
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May 10-12
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If you are organizing, or otherwise know of, an event important to Apple users, and would like it listed in the inCider Calendar, please drop us a line at Pine St., Peterborough, NH 03458. Include the name of the event, the date, the location, and the name of a contact for further information.

inSidious inSolubles Solution, from page 96

Solution to Distance Finder:

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The Apple Clinic

by Earle Hancock

•Franklin's Memory •Apple's Shutdown •80-Column Catastrophe

Hello everyone! Before I dip into the mailbag I wish to clarify a controversial issue.

Franklin Ace 1000 Upper Bank RAM Select Switch

Several readers have asked if one can increase the RAM of a Franklin Ace 1000. The machine's standard configuration has 64K of RAM on the main logic board. If slot 0 is to be used for any peripheral card (especially a RAM card), the upper 16K of the on-board RAM must be disabled. RAM cards can often be used in other slots, but traditionally they are found in slot 0 and some programs using the extra RAM expect to find it in slot 0.

The Ace 1000 manual explains how to disable the 16K upper bank in Appendix C of my version (the old version), but the modification is fairly permanent. Further, it may be that someone would like to have an integer basic card in slot 0 and still be able to use the upper 16K of the on-board RAM when it was needed.

Newer versions of the Ace 1000 have three posts and a jumper wire on the motherboard to accommodate just such a change, but you must open the computer's cover to get at the jumper. The instructions below describe a method of installing a switch: One side of the switch is to enable the upper 16K of on-board RAM; the other side is to disable this 16K and thus enable slot 0.

Be sure to read all the instructions before starting.

1. Unplug the computer from the AC main.
2. Turn the computer upside down.

3. Loosen the bottom cover by unscrewing the 11 screws around the outer edge.

4. Gently lift the computer and place it right side up. Lift the front of the main case and carefully unplug the keyboard connection, and then set the case aside.

5. Unplug the power supply cable and the speaker connection. Remove all the screws holding the motherboard, paying special attention to the placement of the screw with the plastic washer. Lift the motherboard free of the metal bottom and turn it upside down (component side down) on a soft surface.

6. Identify the CPU 6502 and the D0 ROM found on the "up" (component) side of the board. Note the space between them just at leg 13 of D0 and leg 21 of the CPU. Find the corresponding place on the back side of the board. The traces look like the drawing in the Figure.

7. Cut the trace that has the "bow tie" and solder an insulated wire to each of the three spots identified as 1, 2, and 3 above. Number three is the common wire and is soldered to the center connection of a double pole-double throw switch. The two remaining wires are soldered (one each) to the two remaining poles of the switch (have the wires long enough to exit the back of the computer when finished).

8. Assemble the computer parts in reverse order.

9. The switch can be free-floating or attached to the back of the computer as you wish.

When you're finished, the switch in one position will enable the inter-

nal 16K upper back of RAM and disable slot 0. In the other position the switch will disable the internal 16K upper bank, leaving slot 0 available for your use.

Who Is Turning Off My Computer?

I am hoping that you might help me with a problem that my Apple II Plus is exhibiting. The system sporadically turns itself off when it feels like it, and will turn itself back on when it feels like it (assuming the power switch has not been turned "off" after the system "died"). The monitor, printer and computer are all powered through a single plug-in surge suppressor unit and remain powered up when the computer dies. Pages 92-94 of the Apple II Reference Manual say the fault may be with the power supply except:

- 1. I do not hear the "wind-up" of the oscillator as it passes through the audio range.
- 2. No "clicking" is heard at turn-off or turn-on.
- 3. The on-off symptom is not periodic.

Sometimes the computer will shut down within five minutes. Sometimes it will not shut down for 45 minutes. Sometimes it'll stay alive for hours or not shut down by itself at all. After it

Earle Hancock directs the microcomputing project at Minuteman Regional Vocational School, Lexington, MA. He has served as an advisor to the Massachusetts Association of Vocational Administrators, and belongs to a number of computer organizations. Write to him c/o inCider, Pine St., Peterborough, NH 03458.

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DISK DRIVES DISK DRIVES

has turned itself off, no amount of switching will turn it back on until it's good and ready to start.

I have tried to isolate possible causes of the problem by removing boards from the slots all at once, or just leaving a single board in at a time. Just when I think a certain removal has corrected the condition, the problem appears again. As a result, I can say that it doesn't make any difference whether the boards are in or out—the problem still periodically rears its ugly head.

Through a third party connection within the Apple sales network, the best that Apple can guess is that it might be the power supply—but power supply problems usually show up with a definite, not irregular, pattern. They suggested that I "pop in" a new power supply for \$35, obtainable from a local Apple dealer. But:

- 1. Local dealers will not sell me a power supply.
- 2. They say that even if they did, it would cost \$125 (not the \$35 that Apple said it would cost).
- 3. The people at the dealership said they would replace the power supply—for starters. They finally admitted that they didn't know what the problem might be and would continue to replace components until the problem was corrected. (They would be spending my money pretty freely!)
- 4. Lastly, Apple's unofficial response was that the service capability of the two local Apple dealers left very much to be desired.

If the problem is the power supply (Astec), the Apple Reference Manual doesn't give any component values or test voltages to probe so I can make the repair myself. Hence, not being able to buy a power supply, Apple places me at the mercy of their service agencies.

One last thing is quite scary to me. The on/off switch sees lots of use. When it fails (not if it fails) I can't see replacing a \$125 power supply for just a \$2 switch. Is it just the two "pop rivets" in the power supply sides which prevent it from being dismantled after the eight screws are removed? I can carefully drill the heads

off, but then what commercially available switch will fit as a direct replacement? Please...help!

R. Alekshun
Auburn, MA

It is possible that the connection between the power supply and the motherboard is weak. When the power supply detects a "no-load" condition (if the output circuit is open) it will cut the power output, thus preventing damage to its circuits. After a while, the power supply will try to restart itself. If the "no-load" program has been eliminated, it will function properly.

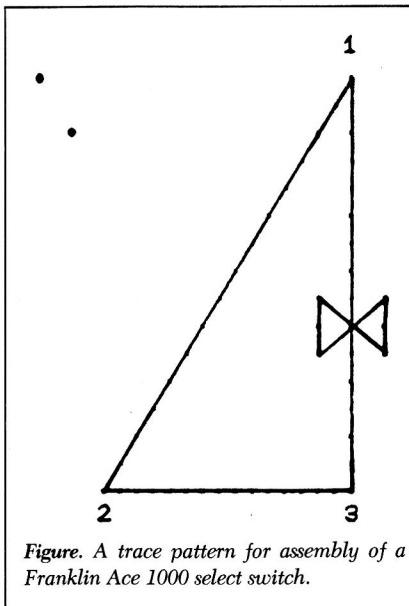


Figure. A trace pattern for assembly of a Franklin Ace 1000 select switch.

The power supply connector can be removed from the motherboard and cleaned with alcohol or tuner cleaner. Pinch the sides of the connector and pull up to remove it.

The problem probably lies with the power supply. My advice is to replace it with a new one. Your dealer should be able to replace it for around \$65. Although Apple may charge the dealer \$35 to swap the power supply (your broken one to Apple for a new one), the dealer in turn will have to charge you labor for installing the new part. I cannot fairly comment on the labor charge.

If you bring your computer to my

service department and we are asked to fix it, we will fix it by replacing the appropriate component. If in the process we find that one or more of the replaced components did not solve the problem, we put your components back in and do not charge you for them. I believe you will find that most service departments work that way.

Any attempt to service or replace parts that are not defective is dishonest and should not be tolerated. It is the responsibility of the service department to diagnose the problem in a piece of equipment brought in for repair. Sometimes that diagnosis is difficult and is best served by component swapping. That does not mean that the customer must pay for swapped components found to be non-defective.

You correctly assume that you can get at the inside of the power supply only after removing the screws and the pop rivets. Once inside, replacing the on/off switch is easy. The three or four styles of on/off switches used in the Apple II Plus all should be readily available from an electrical supply house or electronics hobby store.

Please note that you void your warranty if you tamper with the power supply—more specifically, the pop rivets. Additionally, if you damage the inside of the power supply, Apple Computer Co. may not accept it for exchange. This would mean that it could cost \$160 instead of \$36 plus labor for replacement. More important, the power supply has high voltages which could be "dangerous to your health."

Euro-Power Revisited

In the December Apple Clinic column a reader posed the question of how to use an American Apple in Europe (220 volts, 50 hertz). My advice was to be most careful about current converters and try to trade his American Apple for a EurApple with someone headed for home.

Several readers on both sides of the Atlantic responded with helpful information based on their experience.

They have had no difficulty with American Apples and monitors run on a step-down transformer (220 to 115 volts) so long as the monitor is rated the same as the computer. This means an American Apple must be with an American monitor and a EurApple with a European monitor (due to video timing). These readers had not tried a EurApple and European monitor with a step-up transformer in the U.S., but reason suggests that it would work.

Any well-used computer will be worth only a fraction of the cost of the data it manipulates, so I still advise caution with regard to the Euro-power issue, and suggest taking more than the usual precautions for backing up valuable data.

I thank the following readers: R. Schneider, Edinburgh, Scotland; R. Bernheim, Warrenton, VA; and W. Reeder, Pompano Beach, FL.

Software Compatibility and the IIe

I had an Apple II Plus that I was using quite extensively with Apple Writer II and VisiCalc. I was considering buying an 80-column card to augment these programs. After checking and comparing costs and features, I decided instead to sell my Apple II Plus and buy an Apple IIe with an extended 80-column card. Now I find out that I can't use the 80-column feature with either of these programs. If the 80-column card is activated, I get 40 letters separated by 40 spaces. I understand that the Videx 80 column pre-boot won't work either because it was designed for the Videx 80-column cards. There should be some way to access this card with these two programs. Can someone help me with this?

M. Dodson

Mission Viejo, CA

You are correct when you say that the Videx 80-column pre-boot will not work with the Apple IIe and VisiCalc. Now that's a fine kettle of fish!

VisiCorp has an update to VisiCalc

that does take advantage of the IIe 80-column card. To get it, send a letter requesting the VisiCalc update for the IIe to, VisiCorp, Customer Service Department, 2895 Zanker Road, San Jose, CA 95134. You must include with your request proof of purchase (sales slip) of an original VisiCalc (not a copy), or be on the warranty list (that means you filled out the owner registration/warranty card that came in the VisiCalc package), or have the registration/warranty card and send it with your request. In addition, VisiCorp requires proof of purchase of an Apple IIe and a check for \$50. You need not return your current VisiCalc disk and manual.

You will receive a new program disk and a new manual. If you have a 128K Apple IIe, you can upgrade

your current VisiCalc program to VisiCalc Advanced Version. The procedure is the same; the cost is \$200. It is encouraging to know that in either case your data files are completely compatible with the updated programs (13 sector fans will have to "muffin" their files to 16 sectors).

The case for Apple Writer II is not so encouraging. There appears to be no way to take advantage of Apple's 80-column card while using Apple Writer II. Sorry about that.

Your Letters Count!

Let us help *you!* If you have questions about maintenance and/or repair, send them to: The Apple Clinic, c/o *inCider Magazine*, Pine St., Peterborough, NH 03458. ■

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DEALER INQUIRIES INVITED

by Gregory R. Glau



Selling Savings

As luck would have it, both Bob and Mike showed up at the prospect's house at the same time. Though surprised, the two competitors smiled at each other, shook hands, and rang the prospect's doorbell. The somewhat nonplussed customer let the two businessmen in. The two salesmen decided that, heck, since they were there anyway, they might just as well present their proposals to the prospect, even though the "competition" was there to watch and listen.

Then a strange thing happened. Mike had a good proposal—exactly what he and the prospect had discussed earlier. His price was lower than Bob's for the same equipment, and basically the same installation and guarantee. His reputation was just as good, as was his knowledge, selling manner and personality. Alas, he didn't get the job. Instead, Mike sat and uncomfortably watched Bob make his presentation. It almost duplicated his own as to brand name, type of installation, warranty, and so on. But at the end, instead of simply handing the prospect a sheet or two of factory literature (as Mike did), Bob pulled out some sheets he'd had his Apple create for him, personalized for this particular prospect. While nothing spectacular, these few pieces of paper swung the job Bob's way.

Customized Paper

Would you present a proposal to a potential customer that didn't have his or her name on it? Would you type (or, with your word processor, create on your Apple) a detailed spec-

ification sheet for a job, but leave out your prospect's name? Of course not. But isn't that exactly what we do when we hand out factory literature? It might be attractive and informative, but the prospect could have picked it up at our office all by himself. So why are we there?

It doesn't matter what you sell: If you can personalize your approach for each customer, you'll see your sales increase dramatically—and your Apple can help.

Cost vs. Price

As any businessperson knows, the costs of purchases should be calculated over the long term. Operating costs can include insurance, financing costs, maintenance expenses, repair bills, "down-time" costs, as well as the inescapable gas, oil or electricity bills. Since everything from cars to refrigerators to copying machines to outdoor signs uses some form of energy, this is an ideal place to begin your customizing process.

Let's look at operating costs and how *your* product can lower them—and with an eye to getting a contract signed.

The Joy of Options

Most businesses handle more than one brand of any particular item, and these brands often have different grades. In our air conditioning business, most manufacturers have a *builder's* model, the least expensive to buy but the most expensive to operate. Manufacturers often produce *standard* units, which cost a bit more than the lower grade but save a tad on operating costs. Finally, they'll

provide a *deluxe* unit that—while it initially pains the pocketbook—is actually inexpensive to operate and often includes extra features that make it well worth its initial investment.

In our heating and cooling work, other than different grades inside a brand, we also have clock thermostats, vent dampers and fuel-efficient furnaces. Your product line may be much the same. If not, there may be other add-on items that can cut energy consumption.

A Look at Savings

For instance, assume you have a customer who wants to replace his current air conditioning unit (or refrigerator, or water softening unit, or whatever you sell) with a more modern, energy-efficient system.

You may not need a chart or graph to explain that "This product will cost you 10 percent less to operate than the older units." Keep in mind, however, that *ten percent* may be something of an abstraction for your prospect. He has to somehow translate that percent into dollars. Why not do it for him?

In many cases, you can start with the literature your wholesalers provide and build from there. If you use a spreadsheet program in your business (like VisiCalc or Multiplan) you can create numerical "what-if" scenarios for your prospect. A good graphics system lets you paint pictures of the same data.

You might want to create a worksheet or a graph for your prospect

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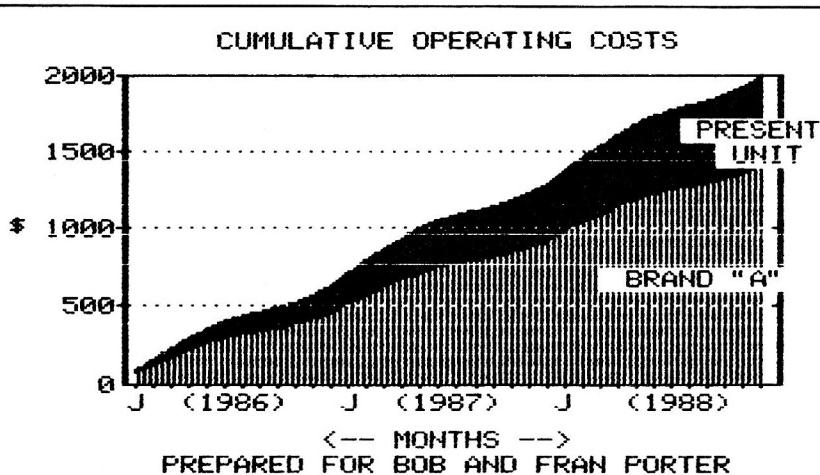


Figure 1. An example of what not to do—a look at the operating costs.

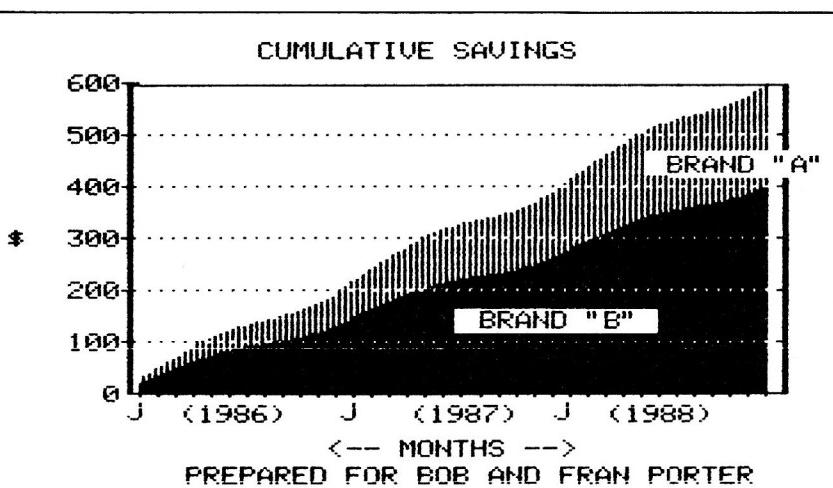


Figure 2. An example of a good graph—a look at the savings your customer can expect.

that illustrates the difference in operating costs between his present equipment and the equipment you recommend. Figure 1 illustrates this approach with a representation of the cumulative operating costs for a customer's current system, along with what those costs would be if he replaced it with a brand "A" system from your business. If the customer lets you install this particular equipment, he'll spend about \$1,400 to operate it over the next three years. If he keeps his present system, he'll spend around \$2,000 during the same period.

This approach is probably the *worst* thing you can do, because a customer's eye immediately leaps to the largest number on a spreadsheet or highest plot on a graph, and you'll hear something like, "You mean, I'll

spend *that much* to run this thing?" So while Figure 1 tells its own story, it's not the best way to handle this sort of information.

A much better way to look at things is illustrated in Figure 2. This simple example compares with the existing system two new proposed units—brand "A" and brand "B"—reflecting customer savings over a three-year period.

Rather than thinking about costs, the customer sees a visual representation of what he'll *save* if he buys either of these systems from you. The focus is on the amount saved, instead of the dollars spent. Likewise, if you create personalized worksheets for your prospect, always concentrate on the dollars saved, rather than on a comparison of total costs.

Figure 2 tells your prospect that if

he lets you install brand "B" in his home, he'll save about \$400 in operating costs over his present system over the next three years. If he instead installs brand "A," he'll save half again as much, as his total money saved will approach \$600. So Figure 2 focuses on potential savings and also tells him exactly what costs to expect if he buys from you. Figure 2 also shows how the rate of savings is better for brand "A" than for brand "B"—that the longer he owns the product, the more he'll save.

A Template

The figures might be exactly the same for many customers, of course, so you need only change the name and print up a new graph for each proposal you make. Why not work up a chart for each area where you can save your customers money on their operating costs?

If you work with a lot of variable information, perhaps you can create the mathematical templates with VisiCalc and store them as DIF (Data Interchange Format) files, and then transfer them to VisiTrend/Plot. Likewise, you can create templates for numerical comparisons inside the spreadsheet, and—with just a name change and perhaps one or two amounts adjusted—give out basically the same worksheet to each prospect.

These particular graphs were done with the latest version of VisiTrend/Plot; it lets you pull an existing chart from disk and change the text items on it—where you put the customer's name and so on—without having to redo the entire graph.

Remember when you work with graphs like this to keep them simple. I tried to put the operating costs for the present equipment, brand "A" and brand "B" all on one area graph, but it became too complicated. To compare multiple items, create two or three graphs for your prospect. Make them as clear and as easy to understand as possible. Add a touch of personalization and you'll find that you, like our "Bob" at the start of this column, will sell more. Isn't that the whole idea? ■

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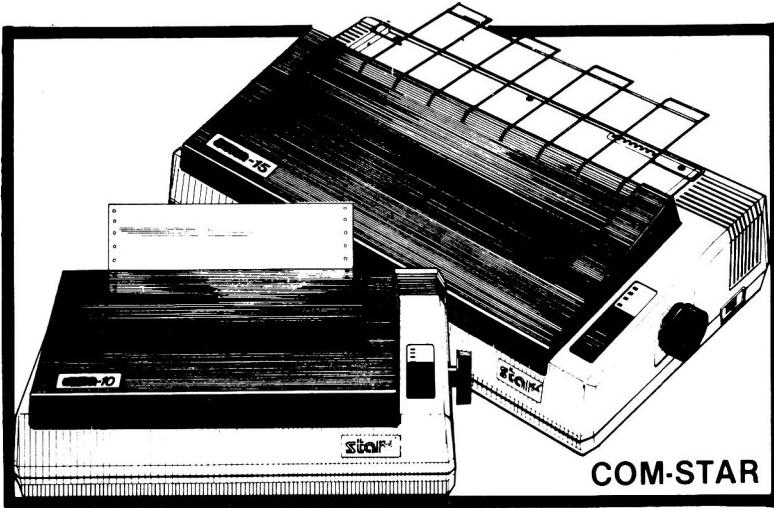


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Software Reviews



The Witness

The place is Los Angeles. The year? 1938. The client's name, Freeman Linder. He claims a threat has been made on his life. He wants you to come to his house at 8:00 p.m. tonight.

The night is cold. Thunder is heard in the distance as you arrive by taxi to the Freeman Linder house. What's this on the curb? A matchbook from the Brass Lantern, a restaurant in San Fernando. As you open the matchbook, you notice a phone number scribbled inside! Could this mean something?

You can't help but wonder why Mr. Linder wants to see you so urgently. Maybe he just wants to meet you in person. After all, you've made quite a name for yourself now after solving the Robner case (*Deadline*).

After ringing the doorbell, Phong, the Linder's butler, takes you inside to meet Mr. Linder. With him is his daughter, Monica, a real looker. As you warm yourself by the fire, the rain pours down outside. Quite a storm outside. Good thing you're inside. Or is it?

Mr. Linder takes you in to his office so you can talk privately about something that is troubling him. This is an office within the house from which he runs his import-export business, The Pacific Trading Company.

You notice his office is nicely decorated; but it's the grandfather clock that catches your eye. What a striking piece of furniture!

Suddenly, there's a shot, and Mr. Linder falls dead to the floor. What happened? Who could have shot him? Only you know, because you are the witness.

The Witness is the second in the series of adventure/mysteries from the people who brought you the Zorks and Starcross, namely Infocom. Although Witness is not as difficult to solve as Deadline, mystery buffs will still enjoy solving it.

The documentation is outstanding. It comes complete with a telegram, matchbook, suicide note and one of my personal favorites—a reproduction of an actual newspaper page from The Register dated February 1, 1938. I suggest you read it thoroughly. Scattered inside are clues that will help you solve the case.

The Witness is written by Stu Galley, and it really gives you a feel for the 1930's. You have a hard-driving detective, a femme fatale and a real thriller of a mystery. So, in order to solve this one, you also have to get into the mood of the '30's.

Get tough! Don't be afraid to push your way through. You have to get tough with your suspect(s) too. Push 'em around. Do it like Bogie would have done it!

When you feel that you have enough evidence to convict your sus-

pect(s), you must then prove the motive, the method and opportunity to the jury. The results come in the form of a letter from your superior, Inspector Klutz, and a summary letter from the jury with either an acquittal or a conviction. Also, if you succeed with a conviction, you will then have the opportunity to read the author's version of what really happened.

The Witness sells for \$49.95. Infocom Inc. is located at 55 Wheeler St., Cambridge, MA 02138. ■

**Linda Beaulieu
Ansonia, CT**

Legionnaire

Leionnaire, a game which pits the legions of Julius Caesar against the tribes of ancient Gaul, is different from most war games I have seen. It does not attempt to simulate a specific battle, campaign or war. Instead, it allows you to command up to ten Roman legions against an army of barbarian tribes, controlled by the computer, on a generalized hires battlefield.

The challenge of Legionnaire is not to outperform an historical commander or to change the course of history, but to gain insight into those factors which determined success or failure on an ancient battlefield.

Legionnaire is a real-time game. The action does not take place in turns but is continuous. You play Legionnaire by giving movement orders to your legions via the keyboard. Each of your legions (and each of the barbarian tribes) possesses a different set of characteristics. One legion may become disorganized easily when marching while another may be vulnerable to attack by barbarian cavalry. As the commander, it is your job to know the strengths and weaknesses of every unit in the game and to exploit barbarian weaknesses while covering up your own.

As I mentioned above, hi-res graphics are used to display the terrain and the combat units. The graphics are good and unambiguous. The game itself is easy to learn. In

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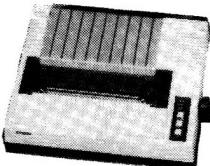
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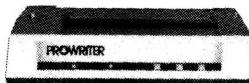
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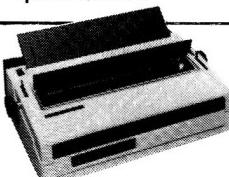
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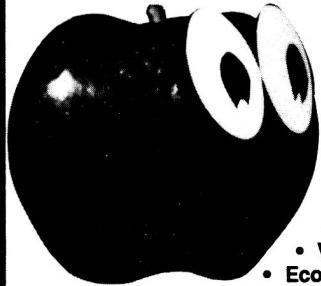
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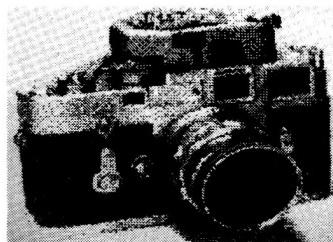


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fact, the only thing I found distressing about the game was the cover art. It looks like a still from a Sam Peckinpah movie.

Legionnaire is an excellent simulation and a satisfying game. In fact, because it is played in real time, you could call it a thinking person's arcade game. If you are interested in Roman history or if you are tired of the same old shoot-'em-up games, I recommend that you take a look at Legionnaire.

Legionnaire was designed by Chris Crawford for Microcomputer Games Inc., a division of the Avalon Hill Game Company, Baltimore, MD. It retails for \$40. ■

Bob Ryan
inCider staff

Write Away

Write Away is a \$175 word processor for your Apple II Plus or IIe that arrives at your home or office with an awful lot of power and just a touch of difficulty. It's a *command-driven* package, which means that to run it properly, you have to learn its commands. Thankfully, most instructions are mnemonic ("A" means Advance in your text, "I" means Insert text, and so on), but there are a lot of them. The HELP screen alone lists 32.

But the good features of the package far outweigh any difficulty. Write Away is not copy-protected. The indexed 147-page manual includes both tutorial and reference materials, and gets you started fast. The two on-screen tutorials act on the tutorial text, so, as you're told to try this or that, you see its effect immediately.

The two basic areas inside Write Away are Edit, where you do your writing, and Format, which formats your printed output. This is where you indicate margin settings, page size, and so on. With a 64K system you move instantly from Edit to Format; with 48K the disk access from one mode to the other takes a mo-

"The only thing I found distressing about the game was the cover art. It looks like a still from a Sam Peckinpah movie."

ment. Since you enter your text free-form, you don't see on your screen what the final result will look like. However, the Format section includes a screen preview to show you how your printed text will appear.

You can override any of the settings you make in Format with embedded commands. For instance, if you need to change the margin settings for a particular block of text, .LM5 sets the margin five spaces over from the left edge. .RM is for the right margin setting, .J will justify your work, and so on. Write Away recognizes all commands in both upper and lower case.

The system also can call other text files into the one you want to print at any point in the document. This means you can print the first part of the text you just edited, call up a boilerplate paragraph and print it next, print some more of your own document, call up a three-page memo and print it in sequence, and so on. You do all this with embedded or dot commands which you insert in your text.

The package requires a bit of minor surgery inside your Apple to hook up the shift-key adaptor that comes with Write Away. No soldering is required and the instructions and drawings in the manual are clear.

Write Away will automatically recognize and use a number of 80-column boards (including Apple's for the IIe). It's a quick task to let the system know where your printer is, and almost as fast to send control characters to the printer to tell it to print something sub- or superscripted, in boldface, italics, and so on. If your printer can handle incremental spacing, Write Away lets you talk to it about what character pitch you want. You can even have your text printed with as many spaces between lines as you'd like—some other systems allow only single or double-

spaced text. You can use continuous or individual sheets of paper, and can stop and re-start (or abort entirely) a print run at any time.

That brings us to another main plus for Write Away—it loads fast and works fast. You can move instantly to the start or end of your text, back or forward one complete screen, even to the start of a line of text. You can delete a character, a number of characters, or kill your text from the cursor to the end (or to the beginning) of your document. When you scroll through your work line-by-line, the entire screen re-writes itself each time you ask for a new line, but it's so fast that you hardly notice what it's doing.

Write Away supports a macro function, although in a different form than other systems. Many other word processors consider a macro as a word or phrase that's inserted into your text whenever a particular key or two is pressed. In line with its basic design, Write Away lets you make what you might call command macros, which in effect create a string of commands. Each time you key a specific sequence, these commands are executed.

You can search and replace on an individual or global basis. However, since this function (like all others) is command-driven, you must use a specific sequence of codes to perform it. The program searches only in a forward direction, but the commands you use to start a search automatically take you to the beginning of your text.

Write Away's embedded commands allow almost any sort of text manipulation. You can leave room for a footnote, for example. You'll have to manually put the footnote text into the document, but the system will save the space for it. Titles are easy to put in, and the program can automatically page-number your work.

Block moves are supported. Write Away can handle about 4000 characters in its save buffer, or about 65 lines of text. You mark the start or end of the block you wish to move with an asterisk, but you don't see it. You then move your cursor to the other side of the block and press the

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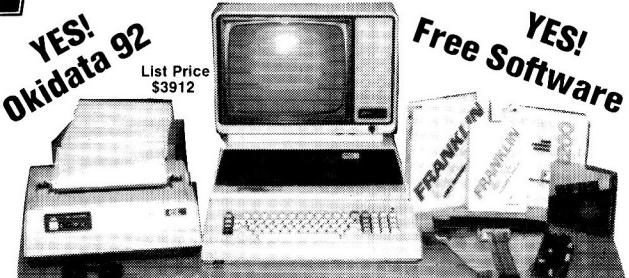
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colon key. This deletes this section of text and puts it into the save buffer. You can insert this block of text into your document as many times as you wish; you can even put it right back where it was and still retain it in the save buffer area.

The package can handle soft hyphens. "Often," the manual says, "in Justify mode a long word is forced to a new line, thereby causing excessive space to be inserted in the previous line." If you tell Write Away to put soft hyphens into long words, they'll break apart properly so you won't have all those extra spaces.

Write Away lets you create form letters and will stop and ask for keyboard input where necessary. You can use the program itself to create text files with data in them for name, address, and whatever else you want to use in your form letters. It also will interface with a limited number of file-

management programs (including DB Master) to draw information from them and insert it into your letters. While the manual notes that conditionals (send a letter to this customer, but not to that one) are only for "... advanced users who are familiar with the concept of conditional (Boolean) logic," it goes into some detail on exactly how to use conditionals in your own files and form letters.

Into each program some rain must fall, and Write Away is no exception. If you put more than four lines of text into the save buffer, you erase your HELP screen. The system isn't protected against reset; it put me back into a partly-operational 40-character mode and I had to restart the system.

When you scroll through your text, the cursor displaces any character it lands on and moves the entire line to the right, for just a touch of visual

chaos on your screen. If you happen to be in the middle of a line and want to move to the middle of another, you can't just go down. You automatically return to the start of the following line, and then must manually move your cursor to where you want it.

Generally, word wrap is in effect; if you type in a word that won't fit on the line, it's carried over onto the following line. In the Insert mode (which you should use only for short insertions), you lose word wrap, so the text looks a bit odd. Also, in this mode your writing is all done at the bottom of the screen. In other words, you enter the text you want to insert following an 'T' in the command line on the bottom of the screen. When you've entered it all, press escape twice and the passage is inserted into your document. You sometimes enter text at a different point than where you have it end up.

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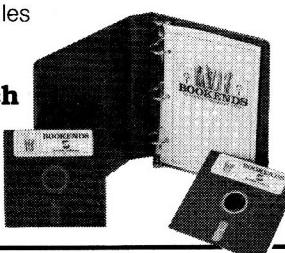


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Finally, while the manual covers the program's capabilities in detail and is easy to read, it's only partly a tutorial. Since Write Away is command-driven, it's more difficult to use than a program that moves you here and there with menus. Someone a bit technically oriented will feel more comfortable with this particular manual than will a person who's a little afraid of the whole process.

An example of this is how you tell Write Away where your printer is located. A menu-driven system might ask, "Printer Slot?" With this program, in the Format section you see a list of instructions—the left and right margin settings, page length, and so on. To tell Write Away where your printer lives, you enter 1E0n, where n is the slot number. This isn't difficult, but might be a little too much computer-talk for some folks.

In all, though, Write Away is a

powerful and complete word processor for your Apple. The commands are mnemonic, which makes them easy to learn, and once you get the hang of how the system operates, you'll feel comfortable with it. One big plus is the fact that Write Away can call other files into a document at any point in the text. Another is its capability to pull data from other file management systems, including DIF (Data Interchange Format) files, and from little mailing lists you can create yourself. And Write Away is fast.

You need one disk drive and at least 48K in your Apple. Write Away takes advantage of the new functions of the Apple IIe, if you have one. You can get more information from Midwest Software Associates, 1160 Appliance Lane, St. Louis, MO 63132. ■

Gregory R. Glau
Prescott, AZ

According to Midwest Software, Write Away now comes with a full-featured terminal program which facilitates immediate transmission of text files over the phone. Also, the program now allows the user to determine 12 function keys.—ed.

AccountingPlus Super/e

If you sat down with your accountant to design a workable, powerful and complete system to do your books on your Apple IIe, I suspect you'd come awfully close to what this integrated package does. There are actually five modules to AccountingPlus Super/e, although I examined only three. I looked at the General Ledger, Accounts Receivable and Accounts Payable units; Payroll and Inventory should be available by the

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What strikes me most about the entire package is that the basic design of the system makes the programs easy to work with. All disks are copyable. Each function is menu-driven. The indexed manuals take you by the hand and lead you through every phase of its operation; you can actually learn the system from the documentation.

In all its facets, AccountingPlus Super/e is powerful: It will write your checks, print your Balance Sheet, send out invoices and statements, keep track of who owes you what, and even tell you how much cash you need and when you should pay people to take the best advantage of any discounts.

The package is quite flexible. For example, the entire structure of your accounting system can be protected with passwords. If you have an employee who works with accounts payable but who doesn't work with (and thus has no reason to examine) your accounts receivable files, you can give him/her a password for the payables only. You can allow any combination of password entries for each of your people (up to eight passwords can be used).

At the same time, if your business is like mine—one person does it all—the system doesn't force you to have a password. You simply tell AccountingPlus to turn its Password Protection off and it won't prompt for one.

Through all of its work, the system tells you how much disk space is available, both in numbers and in percent. Each module comes with a program disk and a sample data disk. You can always back out of a menu selection. The system lets you print just what you see on your screen—a helpful function.

AccountingPlus is fully auditable in the sense that once an entry is in the system, you cannot edit it. Instead, you must make a reverse entry to cancel out the incorrect one.

The package works with either two or three disk drives—and it is hard-disk compatible in all areas. It comes with a firmware card you plug

into any unused slot inside your Apple (other than slot 3); this is the program's way to protect itself against unauthorized copies. Each manual is done in a tutorial manner, so you learn by actual use.

There's a menu selection in each system to convert your data to DIF (Data Interchange Format) files. There are all sorts of advantages to this capability; you can almost automatically take your accounts receivable information, for instance, convert it into DIF format, and then examine it graphically with a system like VisiPlot or with VisiCalc's spreadsheet power.

General Ledger

The General Ledger part of your books is the bottom line—here's where you derive the data for your Income Statement and Balance Sheet. Since that sort of information is stored here, it's logical that AccountingPlus can create these forms for you. But it carries things a step further—you can customize your Income Statement and/or Balance Sheet. The system also stores and tracks up to 13 months of budget data. If you work from a budget, you can have these printouts show that data, too, and it will compare your actual results to the budget (both in dollars and in percentages).

The General Ledger can have up to 500 account types. It's complete in its five journals—the General, Cash Disbursements, Cash Receipts, Sales and Purchases Journals. The General Ledger does not accept out-of-balance entries. Accounts Payable and Receivable report automatically to the General Ledger—you must have it in order to use either of them. If you do use the General Ledger system by itself and post your totals individually, you can make up to 1910 entries per month with a floppy disk system.

If you run out of posting room, the system has a method to consolidate all your data to make more room for your entries. For all practical purposes, then, you have unlimited posting space in your General Ledger files. AccountingPlus even tells you

when this housecleaning needs to be done.

Since the General Ledger is report-oriented (you keep all of your bottom-line data here so you can generate reports), it has a queue function that lets you tell the system to print up to eight reports in a specific sequence. That makes things easy at the end of the month—the package automatically prints the reports you need in the order best for your business. Aside from the standard reports, you get a helpful Use of Funds report, which details your cash flow during any period you specify.

Accounts Payable

The Accounts Payable program tells you how much you've bought from each vendor so far this year. It can produce an aging report so you can see how far behind your payments are and a cash-flow report that informs you of how many dollars you need to pay all your bills. There's even a Discount Analysis report that shows you the best time to mail out those checks. All reports can be sent either to the printer or to your display screen.

When you enter each vendor into the system, you are asked the normal General Ledger account these purchases will be posted to. This then works as a default when you post any invoices from this vendor. In effect, it thinks ahead for you just a bit, as all you'll have to do, most of the time, is press return. Once each invoice is posted, you have the opportunity to change any of the data before it's saved. The program will automatically number your invoices for you.

When you select which invoices to pay, you can decide to pay them all—if you have the cash. Or you can ask to see all the invoices for each vendor and then mark the ones you want to pay. Finally, you can examine only specific vendors and pick out the invoices you wish to pay. Once this selection process is complete, you can request a report that tells you how much cash is needed to pay the invoices you marked for payment. If your bank balance is a little low, you

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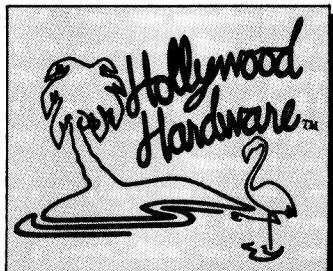
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then can change any or all of your selections.

You can print checks at this time, or whenever you wish. The amount is printed on your checks in dollars and in text—you don't have to run the checks through a check-protecting machine. The system automatically prints a check number on each check, which is a practice I don't care for. When you write checks by hand, you also must number them by hand. If you use the same checks for other purposes (payroll, for example) that you haven't automated as yet, you have to keep track of the next number and write it on each check.

However, at least AccountingPlus allows you to write checks by hand and then enter just their data into the system. It even generates a check register for your hand-written checks. Some accounting systems seem to feel that you must write every check with your Apple, and in the real world, that simply isn't feasible. If your printer's tractor feed eats your checks during a printing, you have the option to reprint them.

Accounts Receivable

The Accounts Receivable system in AccountingPlus automatically posts sales totals to the General Ledger accounts. As with the other parts of this system, Accounts Receivable uses a full double-entry method of accounting, and it won't let you enter an out-of-balance amount.

You can have up to 500 customers on each data disk, and the system lets you use multiple disks. Each disk has room for up to 2150 transactions. You can assign any of nine terms codes to each customer, and the package lets you put user-defined notes on invoices and/or statements. You also determine the finance charge (if any) for those past due accounts.

AccountingPlus handles automatic extensions on your invoices and calculates both sales tax and discounts. Thankfully, if you do invoices by hand, the program lets you enter the sales data into the system; it doesn't insist on printing an invoice. If you do use the package to prepare your invoices, it will check each entry

against a customer's preset credit limit, and inform you if this transaction will take them over it.

Sales taxes can be a problem area when you create an invoice. If you are a retailer, you collect (and pay) sales tax on each transaction. But if you sell labor or resale items, you need a system that lets you charge tax to some customers and not to others. AccountingPlus Super/e gives you this flexibility. When you enter a new customer into the system, you indicate whether they normally pay tax. If they do, the program calculates it for you. If they don't, the program won't add sales tax. In either case, you can manually change the end result.

The Accounts Receivable program is strong in its reporting areas. You can get several aging reports, a print-out that shows which customers have reached or exceeded their credit limit, a report on delinquent accounts and so on. It also prints credit and debit memos.

As in the Payables program, the Accounts Receivable package tracks total purchases this year for each customer. You can operate the system so that each statement lists all invoices.

Receivables also asks for the usual sales account for each customer, so it can be displayed as a default and save you some time when you post. You cannot remove a customer who has any balance or activity in their account.

You can send statements to all or selected accounts. You can add a user-defined dunning notice to the statements, and you can print your company's name and address on your invoices and statements.

AccountingPlus Super/e isn't perfect, of course. For instance, while it boasts that your Accounts Payable or Receivable systems can have up to 500 customer accounts on each data disk, they recommend that you "should not plan to place more than 300 to 400 customers on each diskette." If you have 500 customers on a disk, you'll have very little room for transactions. The figure of 500 is a little misleading, and the manual doesn't indicate exactly what hap-

pens to available transaction space if you try to push the system to its advertised limit. This information is attained as you use the program. But it should be in the documentation too.

There are only eight sales codes available. For Accounts Payable, this is probably enough; but for Receivables, it may not be. My business requires ten, so I have to combine some to use AccountingPlus. Check with your bookkeeper and accountant. The examples in the manual use abbreviations for customer accounts.

The General Ledger, Accounts Payable and Accounts Receivable manuals are good, but the Owner's Manual is a bit awkward. It has a long section on Labels Plus, a method of gathering information from your accounting areas to create mailing labels. This is a good idea, of course, and a powerful addition to the program. Unfortunately, it is explained too early in the manual.

In sum, AccountingPlus Super/e is an outstanding and powerful accounting system for your Apple IIe. You need at least two disk drives and Apple's 80-column text card. A three-drive system will save you a bit of disk swapping. The only real limitation I could find is in the area of sales codes. Are eight distribution slots enough for your business?

The manuals are readable and intelligent. The systems are all menu driven; anyone with even a little knowledge of accounting will be able to use the packages quickly. The General Ledger package sells for \$450. Accounts Payable, Accounts Receivable and Inventory retail for \$350 (each); Payroll will sell for \$450.

You can get more information from Ask Micro, PO Box 1100, 100 Blue Ravine Road, Folsom, CA 95630. ■

Greg Glau
Prescott, AZ

Graph'n'Calc

At my office we have acquired Apple III's to help analyze business ventures. The machines are used daily and often generate reams

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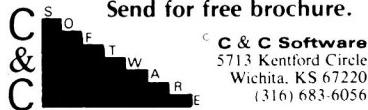
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"Graph'n'Calc was conceived with ease of use in mind."

of paper covered with numerical data. Because few individuals are blessed with the power of quickly discerning trends in a page of numbers, we frequently employ graphics to present an analysis simply. Thus, I welcomed the opportunity to review Graph'n'Calc for the Apple III.

Graph'n'Calc was conceived with ease of use in mind. In addition to providing graph drawing capability, it includes some powerful forecasting and statistical tools. All statistical functions can be accessed from the command menu with few keystrokes. Equipped with DIF file reading and generation ability, Graph'n'Calc can share data with VisiCalc and other programs.

The Apple III version is supplied on two disks, one boot disk containing some invokable modules, and the other containing the graphing programs and sample data files. All the software can be copied. The program was written in Apple III Business Basic and uses some invokable machine language routines.

Graph'n'Calc's design facilitates the entry and editing of data. Except when a graph is being displayed, the top half of the screen contains a window to the data. Up to 100 columns with 10 rows of data may be accommodated in the data fields. The overall appearance of this data area is reminiscent of VisiCalc; however, the scrolling is not nearly as fast. The user can jump from one location in the data to another via a GOTO command. Powerful editing features allow you to copy data from one row to another. Copied data can be shifted left or right. Mathematical operations can be performed on rows of data, and the results stored in other rows. Labels for rows and columns can be entered easily. Row names are limited to 13 characters and the column names are limited to eight characters.

A thin strip running across the middle of the screen displays the command options. The main command level leads to further sublevels. An option from any particular level is chosen by entering the first letter of the option desired. The only exception to this seems to be the GOTO command, which requires that an open apple-G be typed. The command names are chosen logically and require little effort to understand.

Selecting the graph command menu permits the user to draw bar, line, scatter and pie graphs. Bar and line graphs can be combined. Bar charts can be stacked. The user has control of vertical and horizontal scales. The user does not have control over the type of mark used to differentiate one line from the next, nor does the program permit the user to choose the style of fill for bar charts. Data for up to five rows may be displayed simultaneously, depending on the type of graph chosen. Charts can be titled and the axes labelled by filling in a specification sheet that appears in the scratch pad area displayed on the lower portion of the screen.

Once the specifications controlling the appearance of the graph have been entered, the screen clears for a moment. Then the plotting of data on the screen begins. The whole operation is fairly fast, though not as fast as PFS:Graph. Finished graphs may be saved to disk for reuse in a slide show. (Other graphics packages offer this feature as a costly add-on.)

If desired, Graph'n'Calc can print the graph on a dot matrix printer, but only if this printer is driven by a parallel interface card in slot 1. This is one area where the program can stand improvement. Many Epson printers have serial cards so they can hook to the RS-232 port on the Apple III. As sold, the screen dump feature will not work with a serial printer.

An optional program to plot the graphs on a Hewlett-Packard 7470A plotter is available for \$35. I did not test this option.

I was originally interested in Graph'n'Calc for its graphing ability, but I have become enamored with the forecasting and statistical tools provided to manipulate the data. Graph'n'Calc has provisions for

growing data by either a constant percentage or amount, for performing multiple linear regressions, for exponential smoothing and for computing seasonality factors. Best of all, the programmers have provided a means for hooking user-written Basic routines into the program.

Just for the fun of it, I checked the Graph'n'Calc statistics on some sample data with the results from a routine I had written. Both programs gave the same results.

Graph'n'Calc's authors have taken pains to insure that any errors made by the user are caught by the software. Whenever an error is made, a meaningful message is displayed showing the nature of the problem and the required corrective action. The only time I was able to hang the computer was when I tried to print a graph on a serial Epson printer. I had no difficulty with a parallel Epson connected to slot 1.

Graph'n'Calc is accompanied by a 146-page booklet containing a tutorial and a reference section. The tutorial walks the user through a typical sample session using the sample data files provided on the second disk. The total time to complete the tutorial is about two hours.

The reference section devotes at least one page to each possible command. The documentation is indexed well, and each chapter begins with a listing of its contents. The documentation is provided in a paperback format that refuses to stay open at the desired page. After working through the tutorial and then referring occasionally to the booklet during the one month of use, I find that pages are starting to come loose from the binding. The quality of the printing is good, and the screen images portrayed are legible, if somewhat faint.

After a month with this program, I can say it is a valuable addition to my software toolkit and well worth the money.

Graph'n'Calc is manufactured by Desktop Computer Software Inc., 303 Potrero St., Santa Cruz, CA 95060. Price is \$199. ■

Justin Crom
Littleton, CO

North Atlantic '86

War gamers—but war gamers only—will flip over North Atlantic '86. Designer Gary Grigsby and his staff at Strategic Simulations Inc. deserve a thousand congratulations for their exhaustive research of NATO and Soviet military strengths and their interplay in a fictitious (but all too possible) battle for the North Atlantic.

After conquering the European continent, the Soviets seek total victory by starving Great Britain into surrender. Soviet naval patrols and air squadrons harass NATO's British-bound supply convoys, which are defended by submarine and aircraft carrier escorts.

Two of the game's four scenarios are short campaigns revolving around Soviet efforts to sink NATO reinforcement ships. The other two scenarios encompass more realistic elements, such as repair and replacement of ships and morale points and span time frames of two and four months, in which an "A.M. turn" and a "P.M. turn" equal one day.

Considering the 25 minutes it takes to play two turns, a four-month war would take hundreds of real hours to consummate. North Atlantic '86 shares much with Strat-O-Matic baseball—strategy, carefully compiled research and plenty of time to watch the action unfold. Because you can save the ongoing battle to disk after each battle day, serious war gamers likely will schedule sessions over weeks and even months.

A turn comprises eight phases that allow both players to reposition their ships and planes, reinforce bases, and then attack each other. Sinking enemy ships earns players points according to the sunken ship's value; aircraft and troop carriers carry the highest values. Downed planes, curiously, earn no credit.

When each player deploys his fighters, bombers, ships, troops and supplies, North Atlantic '86 enters the air and surface attack phases. The Apple processes the combatants' rela-

tive strengths and projects the battle's results.

In this game, the price of realism is frustration. Since the Soviets are so well entrenched in Europe, their superior strength makes it nearly impossible for NATO forces to challenge them. Especially in the short scenarios, Soviet planes pick off NATO ships with impunity, with only token resistance from the NATO aircraft carriers.

Moreover, the game virtually plays itself. Once you input your deployments, the Apple doesn't need you anymore. You can go out to the fridge, grab a sandwich and return a few minutes later to see how many ships you lost. Few people in this busy world have the time to play North Atlantic '86. War gamers do, however, and they'll love it. It's available for \$59.95 from Strategic Simulations Inc., 883 Stierlin Road, Building A-200, Mountain View, CA 94043. ■

Sam Whitmore
inCider staff

Piracy Pruf

The never ending war between software publishers and the pirates who copy software is a lot like the arms race. Every time one side makes an advance, the other comes up with something new.

The aim of Piracy Pruf is to eliminate the ability of both hardware copy systems and software nibble copiers. The program is entirely menu-driven, but the user still needs to read over the entire manual to become familiar with all the options. The manual itself is a straightforward description of the options Piracy Pruf offers and the reasons behind each of the options. The manual also lists the limitations of Piracy Pruf, which are few. The protection offered by the program includes:

● Reset protection. The user cannot crash out of the program by hitting reset. The protected program automatically reboots if the reset button is pushed.

● Disable DOS. The DOS is modified so the normal DOS commands are rendered inactive if entered directly from the keyboard.

● Detect Autostart ROM. If the Apple does not have an Autostart ROM, then the program will not boot. This feature ensures that reset protection will work, since the old monitor ROM does not support the reboot on reset.

● Eliminate the control-C program stop. You incorporate the short routine given in the manual into the protected program. Then, after using Piracy Pruf, the user cannot halt the program with a control-C.

● Personalize the disk. You can add a serial number or the purchaser's name directly onto the disk. You can also put in a short routine, listed in the manual, that will display the serial number/name when the protected disk is booted.

● Use any type of disk file for your Hello program. You can BRUN a binary file or EXEC a text file for the Hello program. Of course, the use of a Basic Hello program is supported also.

● Alter the error messages or commands by using the Piracy Pruf editor facility. For instance, if you convert the LIST command into the FP, anyone attempting to list the program will clear memory! You can also modify the DOS commands used in the protected program to further protect the disk.

● Prevent the use of a hardware copy device or board. The easiest way is to use multiple files on the protected disk. Hardware boards can only copy what is actually in memory at any one time. You can put a short routine in the protected program to check the disk to be sure it's an original.

● Add the capability of the protected program to store and retrieve data from a nonprotected disk. This is vital to the user. This way the program is protected, but the user can make as many backups of his data as he needs. Remember, the data will eventually become more important to the user than the program that uses the data.

• Protect the data disk with the same protection scheme used on the program disk. This feature allows the user to initialize data disks that have the same protection features found on the program disk. Thus, the program and data disks must be used together.

• Use a random selection scheme to ensure that no two disks are identically protected. This prevents one person from breaking the copy protection and then passing on the information. Thus, the use of one set of copy parameters is negated. However, this feature is optional, since the personalization option lets you use the identical protection information on each copy of the program.

Actually, using Piracy Pruf is easy. You put your program on a normally formatted disk. Then you can go into the Editor mode on the back of the Piracy Pruf disk and make any

changes you wish to the DOS. You can add the two switch files, allowing the user to save his data on unprotected disks. And you can add the necessary routines to check for a protected disk in the drive, convert your Applesoft program to a binary file which is then BRUNed on loading, and put in the files that look for the mini-DOS used by a hardware copy board.

Once these features have been put onto the normal disk, you load in the Piracy Pruf master disk and choose from the menu the protection features you wish to use. It's that simple.

Once I had finished protecting a disk with the Piracy Pruf system, I naturally checked the thoroughness of the protection. I was unable to get into the disk using the available methods. Standard copy programs did not work. The top three nibble copiers would not touch the pro-

tected disk, and the hardware board was also thwarted. Even several Zap programs were unable to read sectors on the protected disk.

Piracy Pruf cannot totally stop the knowledgeable pirate. There is no currently known method of protecting a disk absolutely.

It is manufactured by Kane Computing, 184 Pine Brook Blvd., New Rochelle, NY 10804. Price is \$250. ■

Peter Callamaras
Scott AFB, IL

Troll's Tale

Like most adventure games, the object of Troll's Tale is to find hidden treasures. This game is designed for children who can read at least on a third-grade level. Sixteen treasures, including items as diverse

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Software Reviews

"Children who don't know how to type can still successfully play the game."

as a bag of pennies, a silver cup, and a fiddle, all have been stolen from the Dwarf King by an evil troll. Naturally, the troll has carefully hidden the treasures in various spots within the underground kingdom.

Play begins in front of a dark cave that the child must enter to reach the underworld. From there, the player must navigate through tunnels, crawl down narrow hallways, ascend winding staircases, climb down a well and explore mysterious rooms looking for treasures. From time to time, the player may encounter the wicked troll who stands guard over the valuables. The best course of action, in this case, is to leave the scene quickly and return only after the troll has left.

When the player has successfully found all 16 treasures (and it took this author several attempts before doing so!), he or she must deliver the loot

directly to the King. The Dwarf King, as a measure of his appreciation, makes the player an Honorary Dwarf.

Troll's Tale has several features that make it attractive for use with children. Clearly, the graphics is the most appealing feature. All of the pictures, done in high resolution graphics, are brightly colored, clear and detailed.

The organization of the game is another child-oriented feature. Each scene presents choices in text for the child's next move. The child need only manipulate either the return key or space bar to select his or her choice. Children who don't know how to type can still successfully play the game.

Naturally, the play of any adventure game is significantly easier if one draws a map. This is particularly true for elementary school children who have a difficult time with the concepts of north, south, east and west. Since children usually are not experienced in the area of map-making, Sierra On-Line provides an outlining map that the child may fill in while playing.

In using Troll's Tale at my elementary school, I found that students in fourth through sixth grade were able to use the map outline well. Children younger than third grade had difficulty with the game. They played the game by randomly traveling throughout the kingdom.

Troll's Tale is manufactured by Sierra On-Line Inc., Sierra On-Line Building, Coarsegold, CA 93614. ■

Janet O'Neill
Nashua, NH

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Sammy Lightfoot

Sammy Lightfoot is a little fellow who's auditioning for his own circus act. You make him move left or right, stop, or jump. This game has many nice features such as sounds control, difficulty control, and a high scores display.

The game is divided into three scenarios with 12 levels of difficulty for each scenario. Upon completion of the third scenario, you go back to the first scenario at a higher level of difficulty.

In the first scenario, Sammy's task is to jump from platform to platform using trampolines to gain altitude. Huge beach balls occasionally bounce into his path. These he must jump over or else he will get knocked down. He even has to hang onto swinging ropes to jump from platform to platform. The object is to reach a bespectacled pumpkin on a small platform in the upper right corner of the screen. Keyboard response is excellent, and with a little practice, one can master the first scenario.

In the second scenario, Sammy starts out on a platform in the lower right corner of the screen. He has to jump across six more platforms to reach the left side of the screen. However, these platforms occasionally disappear. If Sammy jumps onto a platform and it vanishes, you lose him. Another danger is that plungers over the platforms are constantly moving up and down at varying rates. When Sammy reaches the leftmost platform, it and the rightmost platform will rise up a third of the screen. Now Sammy must travel over the tops of the moving plungers back to the rightmost platform. When he's gone that far, the platforms once again rise a third of the screen, but this time all the middle platforms and the plungers over them disappear. A flying carpet now appears next to the rightmost platform. Sammy then walks onto the carpet. When you press the space bar, the carpet takes off, and Sammy must ride the carpet all the way to the left platform. The

second scenario takes a lot of practice, but it's a lot of fun.

The third scenario starts off with Sammy in the lower left corner. This time he must avoid puff balls, hammers, and ride elevators. He jumps onto a flying trapeze, over a flaming pit, onto a second trapeze, and finally to the bespectacled pumpkin on a small platform in the upper right.

More difficult levels involve more balls, faster trapezes, faster plungers, and a faster flying carpet. Scoring is very simple: A number (the "bonus number," starting at 10,000) is shown at the bottom of the screen. From the start of a scenario, the bonus number steadily decreases. When you have finished a scenario successfully, the bonus number is added to your score. If it goes all the way to zero, you don't lose a man—you just don't get any points for completing that scenario.

This game has some very nice features. If you lose a man, you start out in the same scenario with a full 10,000 bonus points. If failure gets to you, pressing CTRL-R will restart the whole game (back to scenario 1, level 1). CTRL-Q quits the game altogether and displays the top ten high scores.

If you run out of men, but have a high enough score, you can enter your initials into the Sammy Lightfoot Hall of Fame. Your score, initials, and rank among other high scores is saved to disk.

As with most Sierra On-Line games, pressing ESC will freeze the game action, and CTRL-S toggles the sound on and off. One special feature about CTRL-S not often found in games is that toggling the sound off actually doesn't turn it off—the sound goes to the cassette output jack.

Sammy Lightfoot can be controlled with keyboard, joystick, paddle 0, or paddle 1, with one or two players. If you choose keyboard, you use J to move left, K to stop, L to move right, and the space bar to jump. If you're left-handed, you can use S, D, and F in place of J, K, and L.

Another fantastic feature about Sammy Lightfoot is its built-in option menu. Pressing CTRL-O will display

this menu, allowing you to change the number of players playing, the type of control for each player, and the sound effects. You can also erase the ten high scores, enter the starting level for each player, or return to the game. Another option lets you save all the changes you made to disk. You can call the option menu at any time during the game.

In conclusion, Sammy Lightfoot is a fun, comical game with excellent sound effects, adequate hi-res color graphics, and several levels of difficulty. It takes a bit of practice to get used to, but when you've mastered the lower levels, you can continue at greater levels of difficulty, adding to the fun.

Sammy Lightfoot can be played on the Apple II, II Plus, or Ile. It requires 48K RAM. A joystick or paddle is optional. It costs \$29.95 and is available from Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. ■

Eric Grammer
Peterborough, NH

Teleminder

Stock brokerage houses often put business news at their brokers' fingertips with desktop terminals. These "news recall" systems allow brokers to punch up current or historical news or headlines for any stock that a client might be interested in.

Now, with Teleminder, you can do virtually the same thing at home or work. Teleminder is a new software package from Teleware that allows business and financial news to be automatically retrieved and stored on disk. It was introduced at Applefest Boston by its creator, Terry Kearney, who is no stranger to Dow Jones. He wrote the Market Manager portfolio program, one of three Dow Jones software products.

Teleminder allows you to automatically access all business and financial news and quotes from Dow Jones News/Retrieval on up to 360 companies and industries. You can program up to 20 individual lists with 18

categories each. Lists can be either active or inactive, allowing the user to update individual lists rather than the whole catalog. Examples of lists might be microcomputer stocks, oil stocks, or whatever securities you might have in your portfolio.

The Teleminder package comes with a clothbound loose-leaf manual inside a clothbound box. This is a nice feature that facilitates easy storage both vertically or horizontally. It's a small matter that never seemed to catch on with the majority of Apple software. Software makers please take note!

Teleminder will work on an Apple II, IIe or Apple III. The required hardware includes two disk drives, printer, and Hayes Micromodem or Smartmodem. You also need a Dow Jones password and directory, modular phone jack, and blank disks.

When using Teleminder, you must turn on your printer whether or not you will be printing anything, or else your system will "hang." After booting the program for the first time you will see the message: PLEASE MAKE SURE THAT THE DATA DISKETTE IS IN DRIVE 2 AND THE DOOR IS CLOSED. The program then instructs you to hit the escape key to format the data disk.

After formatting is complete, the System Parameter screen will appear. The parameters needed to configure the system are your Dow Jones password, three local Tymnet or Telenet phone numbers, the network code, the modem type, and the printer setup string. Once this is done, pressing return takes you to the utilities menu to utilize a clock card, if part of the system. If no clock card is to be used, pressing escape will bring you to the master menu, and you are ready to start creating lists.

To close all the files before shutting the system down, press the escape key at the master menu. You will then get a message that all files are closed, and that it's safe to reset the system. Escape is also used to return to previous menus or to abort most functions and input screens, bringing the cursor to the first field.

The program's outstanding feature

is its "Immediate Execute" mode, which will automatically dial, log on, and retrieve news or quotes for all the active lists, then hang up the phone and print the results.

When creating a list, the screen is laid out to make use of the 80-column feature of the Apple IIe. Apple II users press CTRL-A to view the right half of the 80-column screen. CTRL-A is a toggle function, and can also be used in the terminal mode when receiving certain data from Dow Jones in 80 columns.

Before creating a list, the program asks you to name it (up to six characters), then supply 18 security symbols and their appropriate "Type" codes to access the proper Dow Jones database. Type codes are S, B, O, M, T, and I, for stock, bond, option, mutual fund, treasury instrument, and industry category.

Next you must set the access data to determine how far back the Dow Jones database should be searched (maximum 90 days for news). The date is automatically updated whenever the list is executed. This prevents gaps or redundancies in the stream of information.

Once data is automatically received from Dow Jones, it can be manipulated in different combinations. Preset parameters allowing you to save news to disk and print it, save it to disk only, or print headlines only (nothing saved to disk). If quotes are received they are printed automatically, with only the most recent saved to disk. News that isn't printed at the time of access can be printed later with the "story maintenance" choice of the utilities menu.

The secondary portion of Teleminder is the communications mode. This is divided into three parts: news, quotes, and communications.

News allows retrieval of a single stock or industry. This mode will automatically log on to Dow Jones and display headlines pertaining to the symbol requested. To retrieve a full story, simply type the two-letter story code to the left of the headlines. You can scroll back and forth through pages of headlines and stories. The story can be printed, but not saved to

disk, in this mode. Any number of stories from the list of headlines can be retrieved this way, or you can press escape and return to the symbol entry screen for another query. CTRL-Q will take you to the current quotes database.

The quotes section of the communications mode allows you to fetch quotes on up to five securities at a time. The program figures out net change in the price of the stocks from the previous day's close—something you don't get from Dow Jones. Unfortunately, these can't be printed or saved to disk. This might be a good future revision. The main purpose of news and quotes is to selectively research one specific symbol from your lists, or to quickly look up a stock or industry you haven't followed as yet.

The last part of the communications section is the terminal mode. This lets you access all Dow Jones databases, such as sports and movie reviews, rather than just news and quotes. Log on is automatic, but all queries must be made manually. The terminal mode includes a buffer (about 8K) that can be dumped to a printer.

The utilities menu allows data manipulation such as displaying, viewing, deleting or printing stories, headlines or quotes stored on disk in the auto mode. You can also create a disk of historical quotes (up to 1800), back up quote and data disks, and format new ones. System parameters and clock parameters are accessed through the utilities menu too.

Teleminder comes with one copy-protected master disk and one data disk and is priced at \$195. After mailing in the registration card, you will be eligible for a back-up master disk for \$30. The price is a little steep for a back-up, but I'm told a lot of royalties are involved.

Future program updates may include compatibility with the Visi series and Dow Jones software, 80-column cards for Apple II users, and the ability to save only headlines to disk. Updates should be available to existing owners for a nominal fee. ■

Richard M. Fuccillo
Groton, MA

Plasmania

Remember the story of the movie *Fantastic Voyage*? An eminent scientist's life was threatened by a clot of blood in his brain. The clot was situated so critically that surgery was impossible. Fortunately, the U.S. government just happened to possess a ray that could shrink things down to microscopic size. They decided to shrink a mini-submarine and crew down to the size of a red blood corpuscle and inject them into the scientist's blood stream to destroy the clot from the inside. After many misadventures in the scientist's cardiovascular system, the team finally found its way to the brain, destroyed the blood clot and saved the scientist's life.

The arcade game *Plasmania*, written by David Lubar for Sirius Software, works on the same premise. As the game begins, the sub is injected into the bloodstream of a patient whose life is threatened by a blood clot obstructing the blood supply to the brain. Your mission is to guide the sub to the clot and, using your built-in gun, blast it apart and restart the blood supply.

On the hi-res color screen you find displays which monitor the patient's heartbeat, the passage of time, the score and the number of patients saved. In center screen is the graphic of the artery down which your submarine is travelling. You won't have time to glance at the displays, because once play begins the action moves quickly.

As the sub moves through the first twists and turns of the artery, it encounters defense cells, which can be left alone or shot for a higher score. The sub will also sight enzymes, which should be shot to release their healing power and prolong the life of the patient. Further along in the artery, red blood cells appear. Since they carry oxygen to the brain, they should be left alone. On the other hand, the antibodies which appear if the sub touches the artery walls must be immediately destroyed or they

will weaken the patient dangerously. As you thread your way along the artery, an audible monitor of the patient's heart rate lets you know how you're doing. When that heartbeat begins to speed up, drop everything and burn corpuscles to get to the main clot!

Assuming that you have moved speedily and the patient's cardiac monitor at the bottom of the screen hasn't gone flat, the sub eventually encounters the main blood clot, having sighted and destroyed smaller floating clots on the way. Destroying the main clot will take fifteen bursts of the sub's laser. If you do not get the bursts off speedily enough, you collide with the clot and, incidentally, kill the patient. Once the clot is destroyed, you can go on to more patients.

Plasmania's subject matter is off-beat, and mastering the game takes a little time. The game may be played at three levels of difficulty—easy, normal and expert—and you have the option of using single keystroke commands or a joystick to control the sub. *Plasmania* is a *real* blood 'n' guts game that arcade aficionados should enjoy.

Plasmania, manufactured by Sirius Software of 10364 Rockingham Drive, Sacramento CA 95827, lists for \$34.95. It is playable on any 48K Apple II or II Plus system and on the IIe. ■

Brian Murphy
Fairfield, CT

Beagle Basic

How would you like to do this on your Apple?

```
10 RESTART = 20: SWITCH = 30: INC = 40:  
N = 50: DIM A(N): FOR I = 1 TO N:A(I) =  
RND (11)*100: NEXT I  
20 F = 0:I = 1  
30 IF A(I) <= A(I + 1) GOTO INC: ELSE  
SWAP A(I),A(I + 1): F = 1  
40 I = I + 1: IF I < N GOTO SWITCH: ELSE  
IF F = 1 GOTO RESTART: ELSE FOR I =  
1 TO N: PRINT A(I): NEXT I
```

Well, you can, and for less than you might think, with Beagle Basic by

Mark Simonsen from Beagle Bros. Micro Software.

The original Apple II had Integer Basic in ROM and precious little else except the capacity for expansion. When the language card came along, many Apple users realized that it was a way of freeing their machines from the constraints of immutable ROM: We had Pascal; we had DOS in the upper 16K; we had Microsoft Basic 5.0 (if we wanted to buy a Z-80 card); we had assemblers that pretended they were Basic—the list goes on.

I wanted more. I wanted string arrays; I wanted a GET; I wanted an ELSE; I wanted an easy way to tell if a particular hi-res screen location was turned on or not; I wanted a compiler.

Well, Applesoft came along and fulfilled some of those wishes, but it had a lot of shortcomings. Many of these could be corrected with an & or a CALL 768, X\$, but they all took up additional memory. What I really needed was a rewrite of Applesoft.

That is largely what Beagle Basic is. It's made up of extensions to Applesoft and to your Apple's monitor. You need either an Apple II with a language card or an Apple IIe. Beagle Basic moves Applesoft and the monitor from the motherboard ROMs to the language card RAMs. It then permits you to change various rarely-used Applesoft commands to something more useful. (When did you last use SHLOAD, STORE, or RECALL?)

BEAGLEBAS (my name—they modestly call it NEW BASIC) prides itself on being compatible. It gets along fine with FID, RENUMBER and APA. I'll describe in a moment one small hitch using the renumber programs. BEAGLEBAS is compatible with Konzen's GPLE (Global Program Line Editor) with one exception: You can't have both GPLE and the flashing + in escape mode. In addition, GPLE must be loaded before BEAGLEBAS since GPLE normally blocks any attempt to write anything to the language card. BEAGLEBAS cannot be run with DOS relocated into the RAM card. Applesoft needs

10K of memory and DOS takes up 10.5. 20.5K goes into 16K no times and nothing left over. At present, re-number programs trip up on the ELSE command (to them it looks like SHLOAD). Beagle Bros. advises using GPLE or another Applesoft editor to change all occurrences of ELSE to LIST, renumber, then use the editor to change the LISTS back to ELSEs. Re-number programs can't handle GOTO/GOSUB variable names. While you can easily change the value of a line number variable after renumbering, computed line numbers remain a problem.

The three features I appreciate most in BEAGLEBAS are ELSE, SWAP and GOTO/GOSUB variable. SWAP x,y puts the contents of x into y and of y into x without the need of an intermediate variable. ELSE may be nested as deeply as you can nest IFs. The only constraint is that an ELSE must be on the same line as its IF. The ability to GOTO and GOSUB a variable name may not seem important since Applesoft already has an ON X GOTO/GOSUB function. What makes this feature attractive is that you're using variables rather than numeric constants. With Applesoft, that means an increase in speed. In some cases, this increase in speed is phenomenal. The following (pointless) program in Applesoft takes 60 seconds.

```
10 FOR I = 1 TO 5000: GOSUB 2000: NEXT I:  
END
```

```
2000 X = T: T = Y: Y = X: RETURN
```

A similar do-nothing loop in BEAGLEBAS takes only 28 seconds.

```
10 SWITCH = 2000: FOR I = 1 TO 5000:  
GOSUB SWITCH: NEXT I: END  
2000 SWAP X,Y: RETURN
```

On the somewhat more useful side is the three-line program given at the beginning of this article, which is a BEAGLEBAS translation of the Bubblesort routine given in the old Applesoft manual. That program in Applesoft takes an average of 47 seconds to sort 50 items. BEAGLEBAS takes an average of 39 seconds.

BEAGLEBAS also provides the following additional functions:

- TONE PITCH,LNGTH: allows 256 pitch values and tone lengths up to

65535.

- HSCRN X,Y: V=PEEK (234): if the value at 234 is a 0 then the point on the hi-res page whose coordinates are given in X,Y is black. If it is a 1, then that point is not black. Because of the way Apple hi-res graphics work, you can't actually tell what color the point is.

- SCRLDN: causes the text screen to scroll down. Everything on the screen is moved down one line and a blank line is placed at the top of the screen. This is the reverse of the normal Apple screen scrolling. It permits some unusual and amusing screen displays.

- TXT2: Gives you access to page 2 of the text screen. All screen output will now be sent to screen page 2 (\$800.C00). This command will allow you to mix lo-res graphics and text—something which was hard to do until now. You can draw on one page, write on the other and flip back and forth. The one problem with this command is that an Applesoft program normally starts at \$800; writing on page 2 will destroy your program. The way around this is to relocate your program so that it starts above \$C00. A POKE 104,12 and POKE 3072,0, then RUN {program name} will take care of this.

- G2: Similar to GR but turns on page 2 of lo-res graphics. It has the same limitations as TXT2.

- CLRKEY: replaces Applesoft's little-used WAIT command. All it does is poke a 0 into 49168 (\$C010), which clears the keyboard strobe. I can think of some more useful things I would like to have replaced WAIT with (a real KEYPRESS, for example).

Three sets of additional features replace the lo-res PLOT, HLIN, VLIN and COLOR= commands. If you use them, you can't use lo-res graphics. Set 1 contains:

- CLLN: clears a text line from the cursor to the right edge of the text window.

- CLDN: clears text page from the cursor to the bottom of the window.

- SCRLUP: scrolls text up a line.

- BELL: does a CALL -198 or a PRINT CHR\$(7).

Set 2 contains:

- MODE1: turns on graphics without clearing the screen.

- MODE2: turns on text without clearing the screen.

- MIX0: gives you full screen graphics.

- MIX1: gives you split graphics and text.

- PAGE1 and PAGE2: turn on text/graphics pages 1 and 2.

- RESL1: flips the lo-res graphics switch.

- RESL2: flips hi-res graphics switch.

The third set consists of cursor commands:

- CRSU, CRSD, CRSL, CCSR: move the cursor up, down, left and right under program control.

You can modify the sound of the bell to make it less or more obtrusive. You can add a flashing + cursor to indicate escape mode when editing. You can change the length of a listed line to another value. If you make it 40, for example, you will eliminate the annoying narrow 33-column format normally used during a LIST. You can also change the new line indentation value during a listing to squeeze more code on the screen or to make line numbers really stand out. Finally, you can make all your REM statements show up in inverse when they are listed on the screen. The usefulness of this last feature has to be believed.

Beagle Basic's abilities do not end here. Since the language is entirely in RAM, you are also permitted to change the names of the commands and the error messages to just about anything you like. Beagle Basic contains a command-error message editor similar to the one in DOS Boss. At first I thought this was a cute but fairly useless feature until I realized two things. First, changing the name of the command doesn't change the value of the command's token. A BEAGLEBAS program under a normal Applesoft interpreter will display normal commands and error messages. (The new features such as ELSE won't work.) Second, the ability to change command and error messages means I can "write" a Basic

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in a foreign language. Thus, we now have TURKBAS (Turkish Basic):

```
10 TEKRAR = 20: TAKLA = 30: ART = 40:  
N = 50: BOYUT A(N): ARASI I=1 ILE N:  
A(I) = RAS (11) * 100: YINE I  
20 F = 0: I = 1  
30 EGER A(I) <= A(I + 1) GIT ART: YOKSA  
DEGIS A(I),A(I + 1): F = 1  
40 I = I + 1: EGER I < N GIT TAKLA: YOKSA  
ART F = 1 GIT TEKRAR: YOKSA ARASI  
I = 1 ILE N: YAZ A(I): YINE I
```

Such a feature is enormously useful in teaching programming to someone whose native language isn't English. Remember, this program will appear in "English" on an English interpreter, in "French" on a French one, and so on. I'm not sure Beagle Bros. was aware of this potential but somehow it seems very important to me.

Observations and Suggestions

The cursor in BEAGLEBAS should be different from the cursor in normal Applesoft. The cursor value is stored at location \$S440 (54336). It is normally a \$DD (221) or]. You can make it anything you like, but GPLE only seems to recognize two cursors: Applesoft's] and Integer's >. For the time being, we're stuck with using a POKE 54336,190 during bootup.

This patch creates a problem with DOS. After a program that uses DOS is run and control is returned to the keyboard, DOS takes a look at the prompt at location \$33. If it finds a] there, it sets the carry bit; if it doesn't, it clears the carry bit. This bit is a flag so DOS can tell whether or not a Basic program is running. Basic and DOS get confused when they see an Integer prompt with an Applesoft program running; as a result the first DOS command issued from the keyboard after the program has stopped will get you a ?SYNTAX ERROR since DOS is asleep at the switch and Basic doesn't recognize DOS commands. You can deal with this problem in three ways:

- Ignore it.
- After a program has run, immediately type ? and press return. This clears the error flag.
- Make the following patch to DOS

a part of the procedure for loading BEAGLEBAS:

POKE 42604,190

190 is the ASCII value of >. This will keep DOS and Basic happy. It can cause problems, however, if you should load another language into RAM under DOS or if you should enter "real" Applesoft without rebooting. The solution is either to reboot always when leaving BEAGLEBAS or else to add the following line to any program that loads another language into RAM:

POKE 42604,221

As you might guess, 221 is the ASCII value of].

The original Applesoft has several bugs and quite a bit of inefficient code. BEAGLEBAS gives us the chance to correct the former and eliminate the latter. One flaw that has always bothered me is the RND bug: For (machine) generations we Applesoft users have been seeding our random number generators (RNGs) with what may be the initials of someone on the original Applesoft writing project. The RNG seed is stored at \$F123.F127 (61731-61735). Its decimal value is .811635157 and its ASCII value is OGRX. Due to a bug in the code, only the first four of these bytes are moved into the random number space (\$C9.CD or 201-205) every time Applesoft is cold-started. Since the value that appears in the fifth byte depends on how you entered Applesoft, you may or may not get the same sequence of random numbers following a cold start.

POKE 61777,28 will copy the complete seed during a cold start. This will give you the same sequence of random numbers every time BEAGLEBAS is entered or reinitialized with a "FP".

If you don't like the idea of someone else impregnating your RNG, try POKE 61777,23. This will prevent BEAGLEBAS from initializing the RNG during a cold start.

Another bug that can be corrected easily is the one that causes RETURNS to go astray if you jump out of a FOR/NEXT loop. A POKE 55664,134 should handle that one. On the other

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Software Reviews

hand, it's probably better *not* to jump out of FOR/NEXT loops.

Optimization and Extensions

S-C Software (PO Box 280300, Dallas, TX 75228, 214-324-2050) will sell you a detailed and heavily commented source code for Applesoft for only \$50.00. You need two disk drives and their assembler to use it.

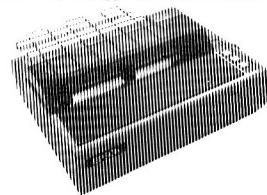
Studying the source for Applesoft will give you ideas for making your own changes, additions, etc. Do you ever use FLASH? I don't. And if you're running a IIe with lowercase, it doesn't work right anyhow. There's a candidate for a new command if there ever was one. How about TRACE and NOTRACE? When was the last time you used them? On the other hand, the USR function could stand some beefing up (or else a complete elimination). Why not turn WAIT into a real Pascal KEYPRESS? Wouldn't it be nice if the DEF FN function could extend over more than one line, could accept more than one parameter, and could work with strings as well as reals? Isn't it time for a PRINT USING? Once language has been liberated from ROM, its possibilities are endless.

Beagle Basic is available from Beagle Bros. Inc., 4315 Sierra Vista, San Diego, CA 92103 (619-296-6400). It comes on an unprotected DOS 3.3 disk and costs \$34.95. It requires an Apple II with a language card or RAM card or an Apple IIe. It includes a short manual that explains all the features on BEAGLEBAS in BBROS' usual witty style and some short programs to demonstrate the extensions. The second half of the manual is *Apple Tip Book #6*. While the program is copyrighted, no mention is made of royalties regarding any applications you might write using BEAGLEBAS. (Compare Microsoft Basic 5.0's legalese.) Common courtesy would lead one to mention BBROS' name in any case. I imagine BBROS want BEAGLEBAS to gain as wide an acceptance as possible. This enhanced version of Applesoft Basic thoroughly deserves it. ■

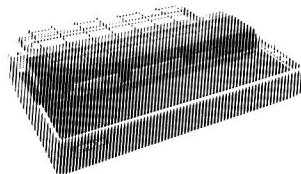
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Book Reviews

Electronic Life: How To Think About Computers

by Michael Crichton

Alfred A. Knopf, Inc.
201 East 50th St.
New York, NY 10022
Hardcover, \$12.95

Having dazzled, awed, even shocked us with certain of technology's implications in his previous works, such as the novels *The Andromeda Strain* and *Terminal Man*, and the movie *Westworld*, Michael Crichton would now reassure us about the friendliness of the microcomputer.

Yet, his stated intentions to the contrary, his coaxing manages to sound like unexamined warnings to the computer illiterates still among us, delivered in a tone of arch naivete by one of the cognoscenti (Crichton lets us know he worked on computers—mainframes, of course—at Harvard in the sixties).

He protests too much. For one thing, in describing the genesis of the book itself—*Electronic Life* started out as a collection of notes for friends who were first-time users—Crichton claims the point is to have fun with the computer, to resist being intimidated by a mere machine. But he comes off sounding like the condescending pal who has already tried something you haven't and can't brook your hesitation. He sounds impatient, cynical at times, as in this statement in a discussion of artificial intelligence: "You'd think by now everyone would have gotten the point: there is nothing a machine can't do."

Unfortunately, an empathetic, closely reasoned argument to win over the computerphobe is just what this book lacks. Instead, he or she will encounter the kind of armchair psychoanalysis of a "condition" that this insulting Crichtonian comment exemplifies: "The person who deeply

resists computers is insecure. His sense of control over his life and work is shaky; he is a person drowning in a lack of self-worth." To top it off, Crichton claims, such a neurotic will often turn into an insufferable computer convert, a persona with whom he would be loath to identify.

Instead, he offers up his own attitude toward the so-called computer revolution for our emulation: embrace the technology because it is inevitable and empowering. And, in fact, we have, he claims, only ourselves to blame if we abandon it to those who would monopolize or misuse it.

Who "we" are, however, is unclear to me. Crichton's vision of the democratization of the microcomputer is socioeconomically limited, his claims for the universality of access to computers, unsupported. If his hand-holding examples for new users in the appendices—programs written for the Apple II and the IBM PC—are any indication, "we" are people who can afford, or whose school districts can afford for our children, machines that are not exactly bottom-of-the-line.

"We"—and perhaps it's our fault again—are more often male than female in Crichton's implied audience. So even though he acknowledges that women need to be more involved with the microcomputer than they've been over the last ten years—an eternity, Crichton comments ironically, in the computer industry—he alludes to women in off-hand, often insulting remarks.

He speaks of the "housewife's fallacy" (new to me) of cleaning, to be avoided at all costs; observes women's "ineptness" when faced with a magnetic medium: "I've never understood why women, far more than men, seem to handle floppy disks by putting their index fingers through the center hole" (Should we tell him?); and when he does address the computer widows (his term) directly, he warns that they "had better recognize what they're up against," namely, the computer as a form of "intellectual prostitute." I'll spare

you his benighted comments on women's resistance to learning to type.

Of course by not targeting his book, overtly, for a specific audience, Crichton made it marketable, a book-of-the-month-club selection, in fact. But in so doing, he stymied his own ability to write a sustained, mature appraisal. In this context the book's format is most telling: it's alphabetized and compartmentalized into short sections that suggest that explanations of the word "byte" and a discussion of "computer crime" carry much the same weight.

"Sectoring" his book this way allows Crichton to dismiss what doesn't suit his purposes: for example, of "Eyestrain" he claims there has been no evidence. (Interestingly enough, that entry directly follows "Error Messages.") And it's a format that further lets him take potshots at serious theorizing, as in the section entitled "Jobs" wherein he discounts the work of not a few economists and political scientists: "It should be clear by now that nobody really understands how an industrial economy works. If anybody did, we wouldn't have problems keeping it running smoothly."

And, of course, if you should lose your job because of a computer...you guessed it: it's your own fault.

Crichton's at his best when he speaks to those with whom he is the most comfortable—professionals like himself. He is helpful to managers who don't know what to expect from a programmer; he's interesting when speculating about how the duties and responsibilities of lawyers, psychiatrists, and medical doctors (he holds an M.D.) will be transformed utterly once the data they dispense is accessible but the human contact they afford is irreplaceable. He imagines a more humane, almost shamanesque role such professionals will have to develop for their own survival.

But if we are to accept his view that computers are empowering by nature, we have to fault him for a rather jejune understanding of the nature of a revolution, and remain

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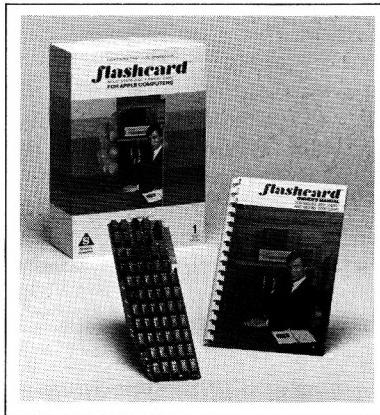
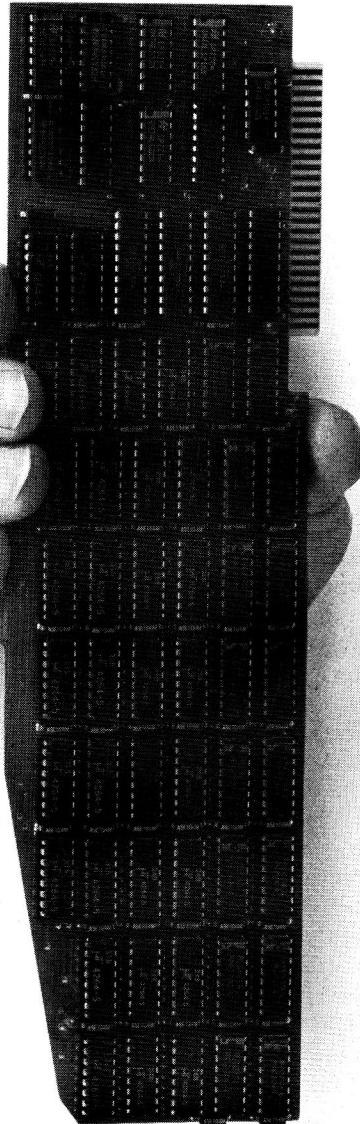
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Book Reviews

appalled by the kind of specious analogy he offers up to convince us to join in because "computers are going to be in everyone's hands—like handguns." ■

Susan Gubernat
Peterborough, NH

Apple Interfacing

by Jonathan Titus, David Larsen
and Christopher Titus

Howard W. Sams & Co., Inc.
4300 West 62nd St.
Indianapolis, IN 46268
Softcover, \$10.95

The Apple II computer's greatest strength may be its eight peripheral slots. These slots permit the addition of interface circuits to expand and extend the computer's capabilities seemingly without limit. One of the major reasons for the success of the Apple II is certainly the large number of interface cards manufactured by dozens of different companies that make customization of the computer easy and relatively inexpensive.

The various computer hobbyist publications have featured many useful interface circuit cards as construction projects, for those Apple owners who prefer to "roll their own."

Given the relative ease with which interface circuits can be designed and constructed, the existence of a book like *Apple Interfacing* is no surprise. It is surprising that there aren't a dozen or more on the market like it, however. Like the rest of the Blacksburg series, it is strong on fundamentals and short on hot air.

The first four chapters introduce the necessary basic concepts and materials. Chapter one describes the 6502 microprocessor, and the second chapter covers the architecture of the Apple II computer. The principles and components of input and output ports are explained in the third chapter. Techniques for synchronizing the computer with input and output de-

vices are described in the fourth.

After these necessary preliminaries, chapter five begins the "meat" of the book. The Blacksburg series places considerable stress on hardware, and this book is no exception. The fifth chapter is a detailed description of an interface breadboarding system developed by the authors as a teaching aid.

The sixth and longest chapter has a series of experiments designed to augment and reinforce the materials presented in earlier chapters. The seventh chapter summarizes the various signals and control lines available on the Apple bus, and describes an asynchronous communications interface adapter (ACIA) circuit using an 8251 integrated circuit as its main component. This is followed by five brief appendices.

Apple Interfacing has no serious flaws but there are a few trivial errors. The text for Figure 6-5, on page 97, identifies it as containing pin-outs for the SN7402 and SN7474 integrated circuits. My copy of the book shows only the SN7474 in that location. The SN7402 can be found, however, in Figure 6-2 on page 92. There are a few others, equally trivial. They do not alter the fundamental excellence of the book.

It is the only book available that covers the essentials of interfacing the Apple II in terms that are useful and intelligible to readers with little or no hardware interfacing experience. The book assumes little prior knowledge or experience on the part of readers, and covers all or nearly all of the relevant materials.

Apple Interfacing is an excellent book for anyone who is bothered by an overpowering urge to make something to fill the empty slots in his/her computer. While it can also be useful as a reference to readers with interfacing experience with other computers and other processors, it is most useful to novices at hardware interfacing who want to learn the essentials of interfacing from the very beginning. ■

F. Kuechmann
Vancouver, WA

How to Create Your Own Computer Bulletin Board

by Larry L. Meyers

Tab Books
Blue Ridge Summit, PA 17214
Softcover, \$12.50

Have you been wondering what to do with your computer now that your checkbook is balanced and you are tired of all those games? How about a do-it-yourself computer bulletin board system? All you need is an auto-answer modem (short for modulator/demodulator) to connect to a telephone line and the time to type in the programs. If time is at a premium, you may buy a disk from Tab Books with the programs ready-to-run (\$30.95 per disk).

The book covers CBB (Computer Bulletin Board) systems for the Apple II, TRS-80, Commodore 64, and the VIC-20 as well as information on CBBs in general.

While this book concentrates on the Z-80 microprocessor-based computers, there is enough to interest those of you who have Apple computers. There are 15 pages in Appendix B with listings for a modular CBB program for an Apple computer with a minimum of 32K of memory, one disk drive, and an auto-answer modem. The CBB system for the Apple computer is called the "Sentry Apple Bulletin Board." The modular programs are: Sentry Initial; Sentry Startup; SYSOP Menu; Sentry Command; Sentry Message Section; Sentry Terminate; and Bulletin Entry. Each of the main modules writes a file to the disk, that passes information vital to the health of the system, which is read by the next program module in a given sequence.

There are several machine language programs and sub-programs for computers using the Z-80 microprocessor, but there are none for the Apple computer.

On page 11 of the book the author states that the programs should be made "as fast and tight as possible." Unfortunately, he has written the modular programs for the Apple II so

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they take up as much of the computer memory as possible and run as slowly as possible—just the opposite.

All in all, this book gives you some ideas as well as a place to start from. It also supplies the answer to the question, "What do you do with your computer?" ■

John W. Davison
Ft. Walton Beach, FL

The DIF File: For Users of VisiCalc & Other Software

by Donald H. Beil

Reston Publishing Company, Inc.
11480 Sunset Hills Road
Reston, Virginia 22090
Softcover, \$15.95

If you are not using a spreadsheet program on your personal computer now you probably will be shortly. If you are using one, you should be aware of DIF files. In either case, this is a book to consider.

A DIF file (Data Interchange Format) transfers data within a spreadsheet and between different pro-

grams. If the spreadsheet you use makes use of this feature (some do not) you probably have a short description in the owner's manual. Other VisiCalc manuals also present ways to maneuver DIF files. What Mr. Beil does in *The DIF File* is to clearly and succinctly provide an excellent tutorial on DIF files that surpasses anything I have read to date.

Starting with some general information and then moving to DIF file usage, the book advances to file interchange with other programs, i.e., VisiTrend/Plot, PFS:Graph, DB Master and Executive Secretary, 1-2-3, TK!Solver, and several others. These "case studies" demonstrate the DIF format as it is used in actual programs, providing not only instruction of file usage, but examples of how these programs take advantage of the DIF potential.

Additional tutorials cover the DIF format, documentation within the models, usage guidelines and limitations. The examples are excellent. You won't be distracted by jumping from front to back in search of other information, to keep your trend of thought flowing. Especially pleasing were the very simple spreadsheet models and pictorials used to illustrate each function and usage of the

files. All examples are kept brief and you will have little difficulty in grasping the concepts being discussed. Along the way, Mr. Beil is always careful to point out the limitations of DIF files and where errors in their usage are likely to occur.

The format structure of DIF is provided along with technical specifications. Basic and Pascal programs are included allowing you to write or read DIF files in your own programs. Although not in Applesoft, the conversion would be easy for anyone familiar with Basic.

An extensive bibliography and listing of commercial software that makes use of the DIF format is included. To top it off, the chapters and subjects within the chapters are well laid out with the various topics easy to locate, making this 235-page book an excellent reference manual to use while designing and using your own spreadsheets; and, yes, there is a good index.

There is more to DIF than you probably know—or thought. *The DIF File* is a scholarly and pleasing book that will complete your education. ■

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Stoddard, NH



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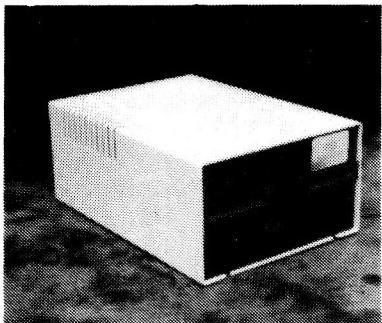
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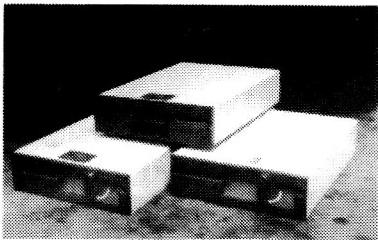
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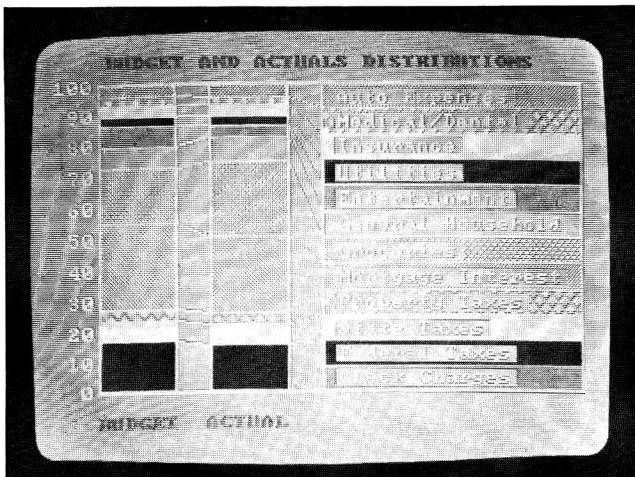
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Barron's Computer Study Program for the SAT combines the test preparation expertise of Barron's with the teaching power of the computer for \$79.95. The program pinpoints a student's strengths and weaknesses, then prescribes a personalized study program. The package contains three two-sided disks with color sound effects, a user's manual and three study guides. Contact Barron Educational Series Inc., 113 Crossways Park Drive, Woodbury, NY 11797. Reader Service number is 460.

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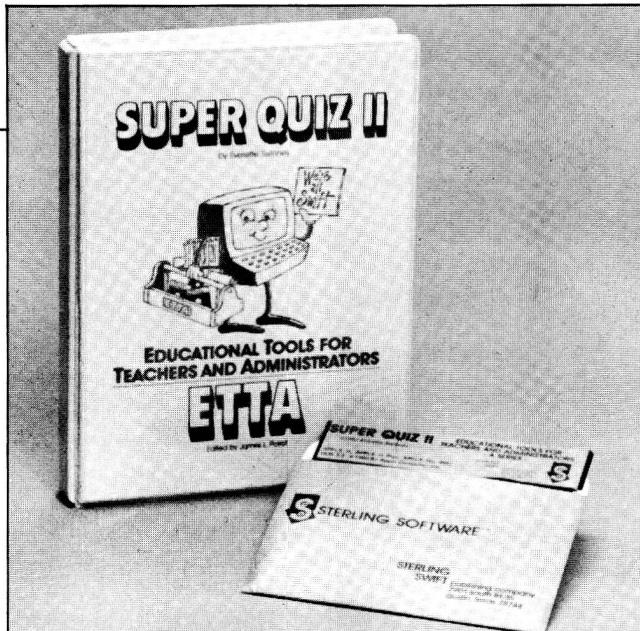
New Software

S/H) updated program from SubLogic Corp., 713 Edgebrook Drive, Champaign, IL 61820. Reader Service number is 469.

TK!Solver for the Apple IIe

TK!Solver, the program that solves equations automatically, is now available for the Apple IIe user who commonly uses equations, formulas, and modeling for analysis, design, planning or problem solving. Suggested cost is \$299 from Software Arts, 27 Mica Lane, Wellesley, MA 02181.

Designed for use with TK!Solver is the TK!SolverPack for Introductory Science (\$100). It is geared toward high school and



Super Quiz II generates 10,000 questions.

college level chemistry, biology and physics courses, and provides models for solving problems in those fields. Reader Service number is 462.

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Super Quiz II is a multiple-choice test generation system that teachers can use to create a test bank of

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Bertamax Inc. has released a carefully graded sequence on Punctuation and Capitalization for grades one to eight (one disk for the primary grades then one for each grade) that covers the skills included in most standardized tests. A teacher's manual and one disk cost \$45.50. For more information, contact Bertamax Inc., 3647 Stone Way North, Seattle, WA 98103. Reader Service number is 465.



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The Apple computer version of Fax, an educational coin-op arcade game, consists of 900 multiple-choice questions in each of four categories: sports, trivia, history and entertainment. The faster you give the correct answer, the more points awarded. Fax is available from Epyx Inc., 1043 Kiel Court, Sunnyvale, CA 94089 for \$29.95. Reader Service number is 463.

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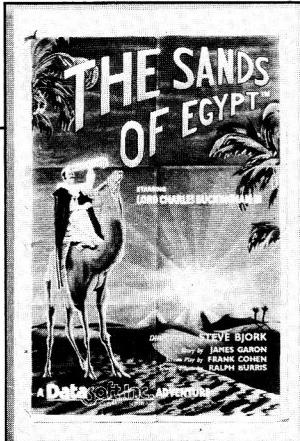
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Hot Time in Egypt

This colorful, hi-res adventure in the hot, dusty Sahara is now available for Apples from Datasoft, 9421 Winnetka Ave., Chatsworth, CA 91311. You must travel across Egypt's toughest desert, dodging dangers and obstacles, as you test your mental ability with hints and riddles that lead to a hidden treasure. The suggested retail price is \$29.95. Reader Service number is 468.

Atari's Best for the Apple

Atarisoft has released seven of its best-selling games for the Apple: Centipede, Defender, Dig Dug, Donkey Kong, Pac Man, Robotron and StarGate, each at a suggested retail price of \$34.95. Contact Atari Inc., PO Box 427, Sunnyvale, CA 94086, for further information. Reader Service number is 466.

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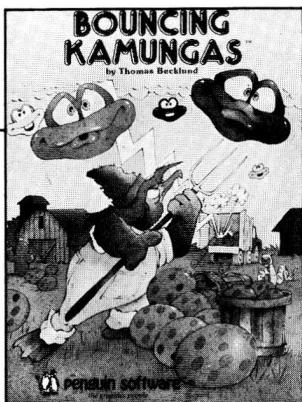
Aardvark/McGraw-Hill announces a Personal Tax Planner that is designed to calculate and reduce personal Federal income tax. The program sells for \$99 from Aardvark/McGraw-Hill, 1020 North Broadway St., Milwaukee, WI 53202. Reader Service number is 467.

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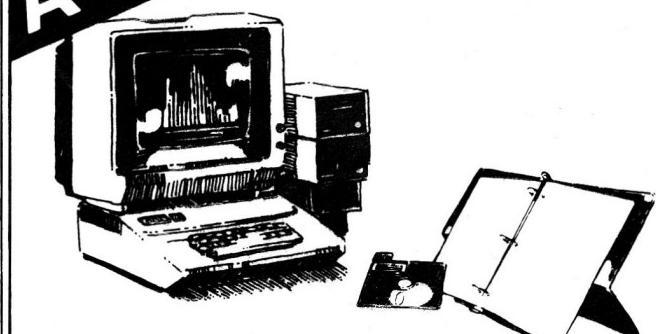
In The Coveted Mirror, an animated graphics adventure, you must find the missing piece of a mirror to protect the medieval village of Starbury from the black-hearted King Voar.

Take the tedious work out of writing applications with Short Cuts, a program that provides easily prompted, formatted and verified input, print formatting, fast sorting with tag files and options for user help screens. All three programs are \$19.95 each from Penguin Software, PO Box 311, Geneva, IL 60134. Reader Service number is 456.

Learning Seed Programs

Three nutrition programs are available from the Learning Seed Company, 21250 North Andover Road, Kildeer, IL 60047. Fast Food Micro-Guide (\$36) prints out a nutritional analysis showing calories, protein analysis, vitamin A, B and C content and amounts of other nutrients from any fast food menu you choose.

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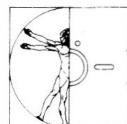
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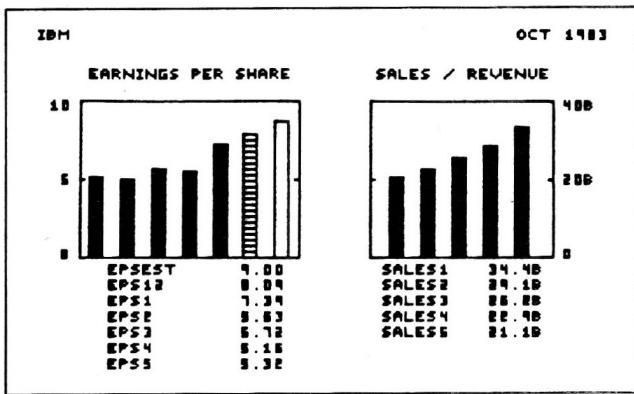
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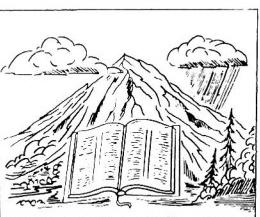
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can master word processing with The Write Stuff. It is completely screen oriented and performs each function with just a single keystroke. This program, for people who care more about words than processing, is available for \$99.95 from Harper & Row Software, 10 East 53rd St., New York, NY 10022. Reader Service number is 452.

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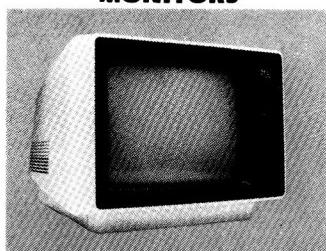
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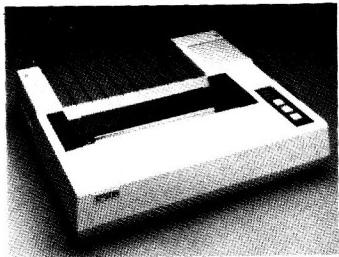
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Hardware Reviews

UDS 212A/D Modem

The UDS Model 212A/D 300/1200 bit per second direct connect modem is an addition to the rapidly growing line of Apple II and IIe compatible modems. The system is an exterior module that attaches to the Apple via a user-supplied RS-232-C interface.

The modem is a general purpose high/low speed communications device that allows any terminal or computer, including the Apple, to communicate with another terminal or computer over phone lines.

The modem directly connects to a two-wire phone system with a supplied extension cord and modular phone plug. This "permissive mode" is standard for the modem, but with optional cables the modem also hooks up to an RJ45S telephone company data jack in the "programmable mode" (allowing control over transmit data signal levels). It can be attached directly to customer leased line phone systems. This is advantageous over acoustic couplers, which connect to the phone system with audio tones through a standard phone headset and are susceptible to exterior noise levels.

Slow speed operation provides 300 bits per second asynchronous communication with the Bell 103 standard used by most personal modems. This makes the modem compatible with most of the available data utilities such as CompuServe and The Source and with most other modems used with the Apple.

The modem has two high speed modes: 1200 bits per second asynchronous and 1200 bits per second synchronous. Both use dabit-phase shift keying. This mode is compatible with the Bell 212A standard used with most high-speed personal communication systems. The Source, for example, easily accommodates the modem at this rate.

The modem has several modes available for dialing the phone. If necessary, an external phone may be

used in parallel with the modem. Built into the modem, however, is the capability to pulse dial at ten pulses per second or to tone dial using the dual tone multifrequency (DTMF) Touch Tone dial at 120 ms per digit.

The modem has a built-in automatic dialer with battery memory for up to five internally stored phone numbers. The Automatic Call Unit (ACU), as it is referred to in the manual, has a number of useful features. It will store and dial any of five phone numbers up to 30 digits each. The unit also:

- Auto adjusts to the computer's communication format.
- Displays a Help menu to the computer on request.
- Pauses for a few seconds or waits for a dial tone during dialing (for example, to access an outside line).
- Displays, modifies and deletes stored numbers.
- Modifies ACU parameters such as DTMF or pulse dialing, aborts timer threshold for hanging up automatically, interdigit dial delay, and local echo of transmitted data.
- Dials manually under computer control (keyboard or Apple computer program).
- Repeats the last number dialed.

The modem has a front panel with six switches and eight indicator lights. The switches are used for various self tests. Long line tests of the modem and phone lines are available for normal operator use. These allow the manual selection of high/low data rates and the use of a phone plugged into the modem for voice operation. The indicator lights serve as status monitors and are used during operation and for trouble shooting. Several of the more important indicators are: TR (Terminal Ready), MR (Modem Ready), TD (Transmit Data), RD (Receive) and HS (High Speed).

There are a number of serial inter-

face cards available for the Apple that provide all or some of the RS-232 signals used by the UDS 212 modem. Some are designed to be one-way interfaces, while others are designed for simple modems and thus ignore several signals lines required for proper operation with the UDS 212. The matching of interface card to modem can be tricky because the computer, interface card and modem are often manufactured by three different vendors.

There is no software of any kind provided with the modem because it is not specific to the Apple. There is a wealth of software available for the Apple II supporting data communication in general, and most of it works nicely with the UDS 212.

Software for the UDS 212 must support your system's serial interface card. Certain features of your software will not work with this modem. For example, most software with automatic dialing features will not have any effect on this modem.

To use the modem's automatic dialing feature, you enter the program's Terminal mode and then access the appropriate dialing commands. The process of programming the modem with phone numbers can be automated using your communication program's file transfer command.

The Universal Data Systems 212A/D modem is an excellent device with a number of advanced features. This product would be better for Apple buyers if Apple-unique interface cards and software were available from or specified by Universal Data Systems. Without such support or advice, the user is at the mercy of his own technical expertise or the good will of his dealer.

The UDS 212A/D modem is manufactured by Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Price is \$645. ■

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(For Filing by April 15, 1984)

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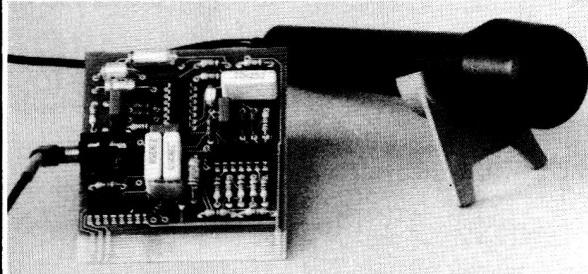
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The SR-32 comes complete with hardware that plugs into a slot of your Apple II+ (48K) or Ile, microphone, diskette with software and user manual. And it has a one year warranty against manufacturing defects.

To order the SR-32 send us a check for \$199. We pay shipping in the US. Foreign orders welcome, add \$20 for shipping.

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New DAVID-DOS II™ Compared With Other DOS's

Now you can speedup Text-file handling two ways

DAVID-DOS II is a new edition of DAVID-DOS with added speed, commands, and features. New Read, Write and Save routines are high speed. DAVID-DOS II updates full disks like Apple's Master Create. (The programs on your disks are not touched). DAVID-DOS II Initials blank disks with Basic, Binary or Exec HELLO in seconds. Ten new commands operate identical to existing DOS commands. Use them from the keyboard or in Basic programs. They accept A & L parameters.

Ten New DOS Commands

1. TLOAD speed loads all Text Files, random or sequential, to ram.
2. TSAVE speed saves all Text Files, random or sequential, from ram.
3. TLIST Lists all Text Files, random or sequential to screen/printer.
4. DUMP Memory to screen/printer in Hex with Ascii on right side.
5. DISA disassembles Binary to screen or printer.
6. AL prints last loaded program Address & Length in decimal & hex.
7. HIDOS moves DOS to Language Card & continues operation of program.
8. / is a one keystroke Catalog in addition to the original command.
9. DATE prints with any clock. Also File Dating with clock or manual.
10. FIND prints address's of hex found in 64k memory. Hidos cmd only.

Compatible

All DOS entry addresses have been preserved. DOS is original length and compatible with most software. David-Dos II is copyable and creates fully copyable updated disks. DAVID-DOS II is licensed by programmers for inclusion in the software they sell. Init areas were used for David-Dos II. Works with all Apple IIs including Ile 80 Col, Franklin & Hard Disks, such as Corvus & Xebec. Requires 48K.

Complete documentation for screen or printing and many utilities are on the disk.

All times in seconds. (Time Test programs available)	DAVID DOS-II	ProDOS	DIVERSI DOS	DOS 3.3	
TEXTFILES (100 Sectors) (791 Strings, 32 chars ea)	TSAVE TLOAD WRITE READ PRINT/READ APPEND	8.0 6.2 29.3 24.3 44.2 142.3	NO NO 28.0 16.3 45.9 142.9	NO NO 29.4 24.3 45.1 151.1	NO NO 88.4 83.8 117.1 1231.2
APPLESOFT (100 Sectors)	*SAVE LOAD	7.1 5.0	16.4 4.0	6.4 5.0	33.1 23.5
INTEGER (100 Sectors)	*SAVE LOAD	7.3 4.9	NO NO	6.6 4.9	33.4 23.4
BINARY (100 Sectors)	*BSAVE BLOAD	7.8 5.8	18.4 4.8	7.3 5.8	28.7 24.5
48K PROGRAM SPACE (With 3 Bufs avail)	APPLESOFT INTEGER BINARY	36.352 36.352 36.352	NO NO 34.816	36.352 36.352 36.352	36.352 36.352 36.352
64K PROGRAM SPACE (With 5 Bufs avail)	APPLESOFT INTEGER BINARY	46.592 46.592 46.592	31.232 NO 40.704	45.658 35.162 45.658	35.162 35.162 35.162
NUMBER OF DOS COMMANDS CLOCK FILE DATING MANUAL FILE DATING ONE KEYSTROKE CATALOG AUTO USE INTEGER CARD ANY SLOT		37 YES YES YES YES	29 YES NO NO NO	31 NO NO YES NO	28 NO NO NO NO

Each Program was tested twice W/Apple Clock Card on a newly formatted disk containing DOS.
*Add 5 seconds for Verify. Apple II, Applesoft & ProDOS are trademarks of Apple Computer

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New Products

edited by Joan Witham

Microfloppy Unveiled

BASF Systems Corporation introduced its new 3.5-inch, Sony-format microfloppy disk that offers high storage and portability with its 80 tracks per side and storage capacity equal to a 5.25-inch disk. Each 3.5-inch microdisk comes with a lifetime warranty and is guaranteed to be 100 percent error-free. Suggested retail price is \$7.50 each from BASF Systems Corporation, Crosby Drive, Bedford, MA 01730. Reader Service number is 470.

Computer Interactive Video

The Omniscan interface connects an Apple computer to a consumer-type (Pioneer, Sylvania, Magnavox) laserdisc. It allows the computer to duplicate the functions of the videodisc control panel under programmed control for full interactive videodisc operation.

You can program (using full-word commands) all the capabilities of the laserdisc player—fast action, slow motion, stop frame, search, audio on right, left or both channels, and automatic switching of the TV or monitor screen to display computer or videodisc output. Omniscan is available for \$275 from Anthro-Digital Inc., 103 Bartlett Ave., PO Box 1385, Pittsfield, MA 01202. Reader Service number is 480.

Uninterrupted Power

Two new uninterruptible power supplies from



BASF microfloppy—smaller is better!



Interface to a laserdisc.

BITS Power Systems provide a totally dedicated, absolutely continuous and completely isolated source of electrical power for your computer. The Model UPS-200 (\$795) offers 200 watt power while the Model UPS-400 (\$995) offers 400 watt power. Standard full load backup time from internal batteries is ten minutes. External 12 volt batteries may be plugged into the connector provided for extended backup time and automatic charging. Four standard grounded output receptacles are included. Contact BITS Power Systems Inc., 11020 Audelia Road, Suite B114, Dallas, TX 75243. Reader Service number is 490.

Apple Shares Network with IBM

Small and mid-size businesses are targeted for PLAN 3000 (Personal Local Area Network) File Server, which allows Apple and IBM to share information and peripherals for a price under \$10,000 for a 10 megabyte capacity. Increased productivity and cost savings come from sharing this system with up to 255 workstations and servers per network. For further information, contact Nestar Systems Inc., 2585 E. Bayshore Road, Palo Alto, CA 94303. Reader Service number is 472.

Early Warning Thermometer

Is your Apple overheating? The Apple Thermonitor gives your computer's temperature in vivid colors

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New Products

to show at a glance how hot it is. Three units are supplied in each package: one for the top or front of the computer, the second on either side and the third on the switch plate controlling the light in the computer room. You can order the package for \$3.95 from Phillips Computer Systems, PO Box 40273, Indianapolis, IN 46240. Reader Service number is 479.

Keep That Printer Quiet!

Eagle Acoustical covers reduce printer noise for a complete line of daisywheel and dot-matrix printers. Covers come fully assembled or ready to assemble in walnut, oak and putty colors. They are engineered to provide easy access, uninterrupted paper flow and problem-free use, and meet all UL requirements.

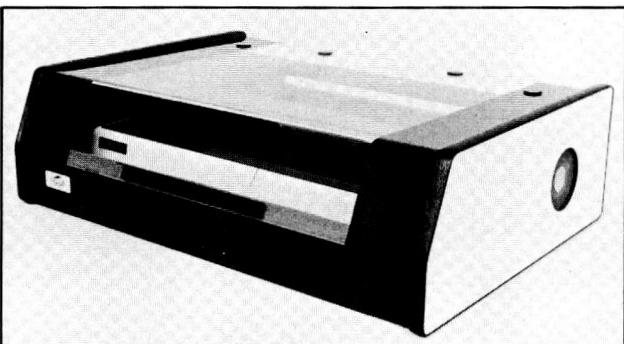
Prices range from \$195 to \$551. For more information, contact Eagle Data Products Inc., PO Box 247, Northville, MI 48167. Reader Service number is 477.

Animated Graphics

The VideoSprite board provides a low-cost method for overlaying graphics on video. The results can be recorded by most video taping equipment. The board offers four graphics modes: sprite and hi-, medium- and lo-res, with sprites in various shapes, sizes and colors. A color composite video input with NTSC standard is needed. The board (\$795) and software are available from Syntex Inc., 10635 NE



How hot is your computer?



Cover that printer noise!



The Wire Tree protects you from dangerous interference.

38th Place, Kirkland, WA 98033. Reader Service number is 473.

SpeeDemon

A new speed-up card, SpeeDemon, makes your word processing, Pascal, Apple Fortran, Applesoft, VisiCalc or game programs run up to 3½ times faster. It is available for \$295 from McT, 1745 21st St., Santa Monica, CA 90404. Reader Service number is 491.

The Wire Tree

A four-outlet filtered power source, The Wire Tree, provides reliable protection against voltage surges, spikes and radio frequency interference. Suggested retail price is \$69.95. For further information, contact Networx, 203 Harrison Place, Brooklyn, NY 11237. Reader Service number is 476.

Logic Switch

Logic Switch, a software-controllable video switch, is designed to plug into the game I/O port. Logic Switch comes ready to install with all input connectors supplied if the user specifies type of 80-column board. Suggested price is \$23.95 plus \$2 s/h. Contact Vytron, PO Box 7019, Alhambra, CA 91802, for more details. Reader Service number is 474.

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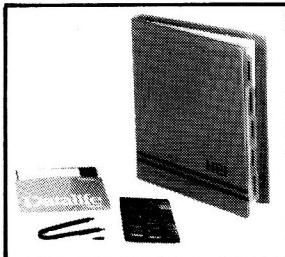
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Circle 398 on Reader Service card.

— REPAIR YOUR APPLE — A SPARE PARTS KIT FOR THE APPLE II AND II+

The Apple II is no longer in production and the need for spare parts, diagnostic routines and service support is increasing rapidly. Included in the kit are: one of each Integrated Circuit (minus the ROM's, CPU, and Character Generator ROM); Integrated Circuit Specifications; Enlarged Apple Schematics; Diagnostic Routines for RAM, ROM and I/O Board ROM's; Disk Diagnostics and Speed Tests and Miscellaneous information.

**KIT PRICE
\$104.95**



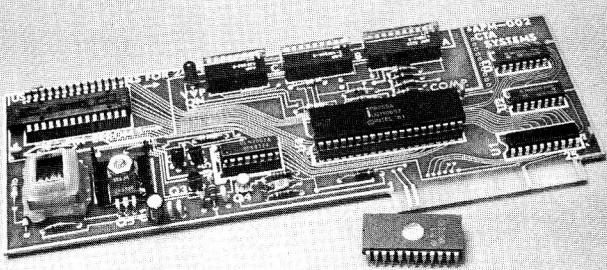
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New Products



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er connections are required. All menu-driven software is provided along with a complete user's manual. For more information, contact CTA, 1794 Moon N.E., Albuquerque, NM 87112. Reader Service number is 482.

are included: Quick-Draw is a complete graphics program to create and edit commercial-quality graphics designs; Amper-Pen incorporates light pen operation into Applesoft programs.

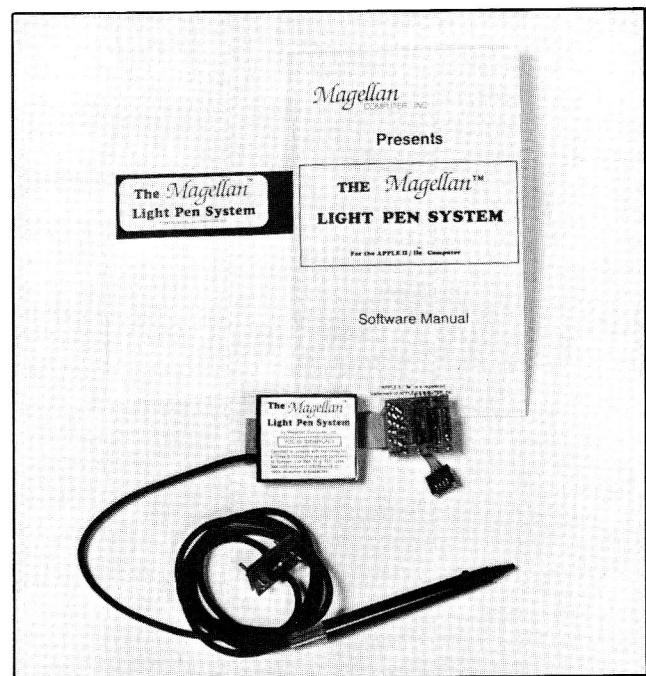
The suggested retail price is \$189.95 for the complete package. Details are available from Magellan Computer Inc., 4371 E. 82nd St., Suite D, Indianapolis, IN 46250. Reader Service number is 471.

You Light Up My Graphics

The Magellan Light Pen System interacts directly with the monitor or television screen to aid in designing graphics. A built-in push button gives maximum control over drawing operations. Two programs

Printer Stands

Valley Craft has introduced two table-top print-



Magellan Light Pen System lightens your graphics programming.

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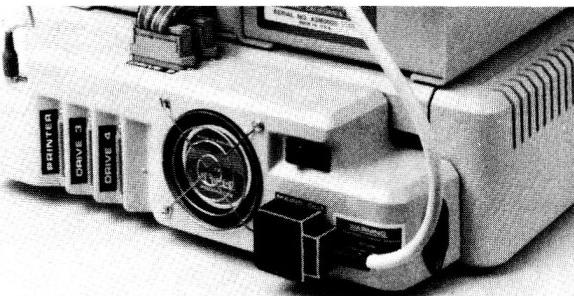
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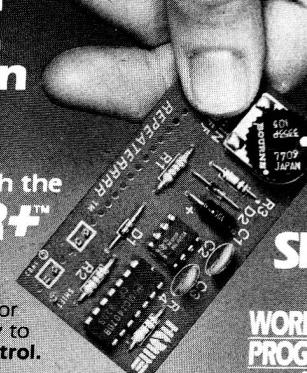


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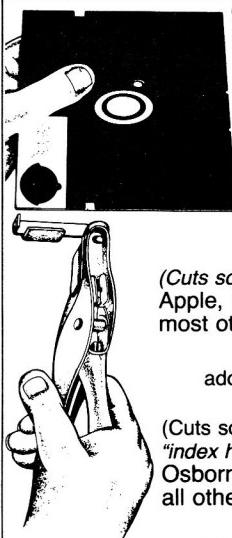
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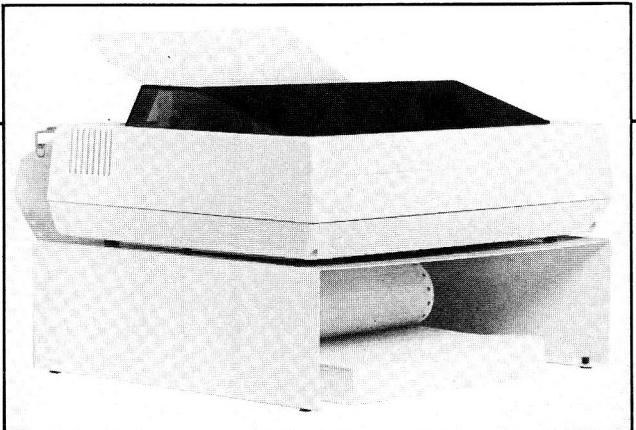
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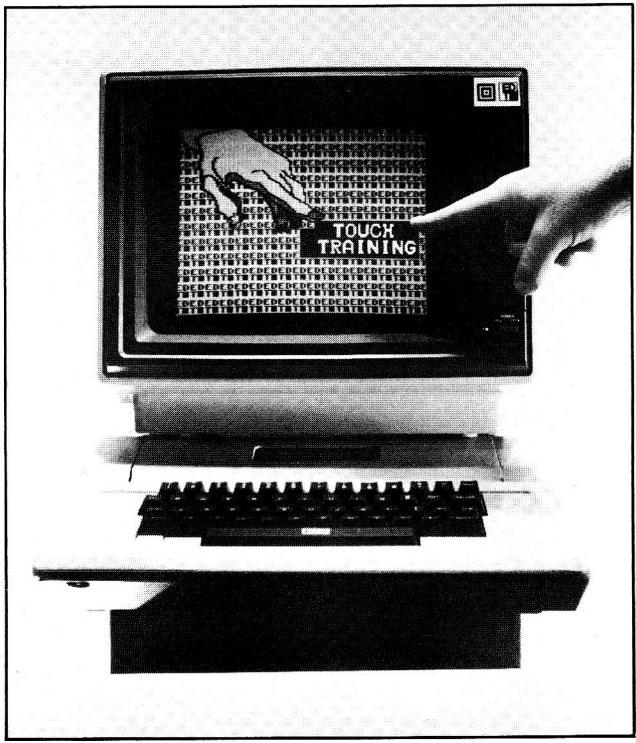
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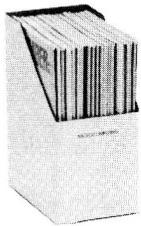
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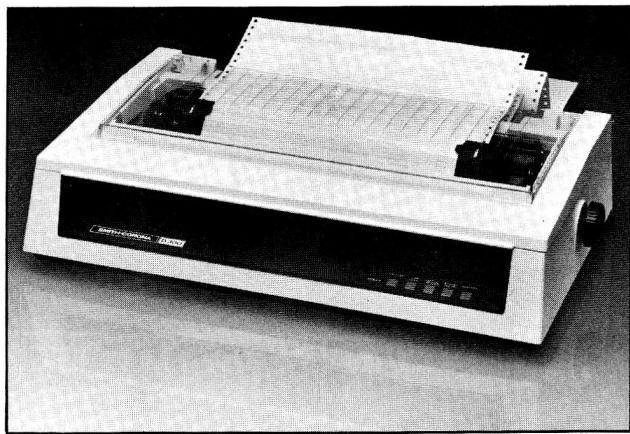
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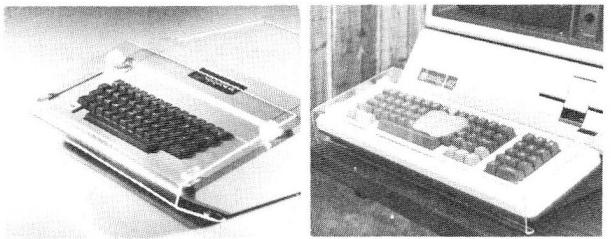
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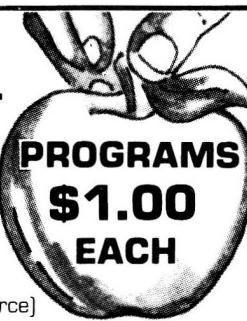
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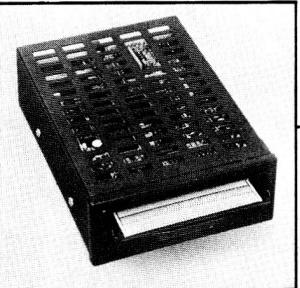
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and English (UK). Dvorak, a rearrangement of the keyboard for faster and more efficient input of information, is also offered.

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Masterbox, a solid black walnut disk box, is designed to offer an alternative to plastic at a reasonable price (\$45 for 50 5½-inch disks). Its classic design enhances any decor while protecting your disks from static and dust. Masterboxes are available from Plein Products, 309 E. Broadway, Bismarck, ND 58501. Reader Service number is 484.

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Low-Cost Microfloppy Drives

Small footprint, light weight and low power consumption make MPI's microfloppy disk drives ideal for desktop computers or portables. Model 321 (\$155) offers single-sided 500K bytes. Model 322 (\$199) offers double-sided 1M storage. For further information, contact MPI, 9754 Deering Ave., Chatsworth, CA 91311. Reader Service number is 481.



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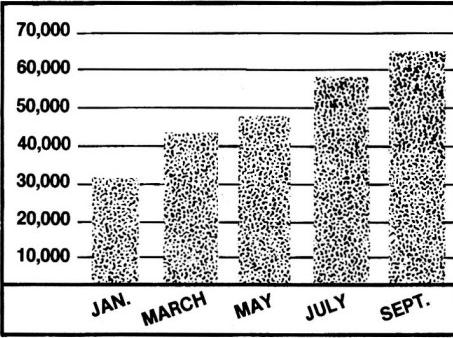


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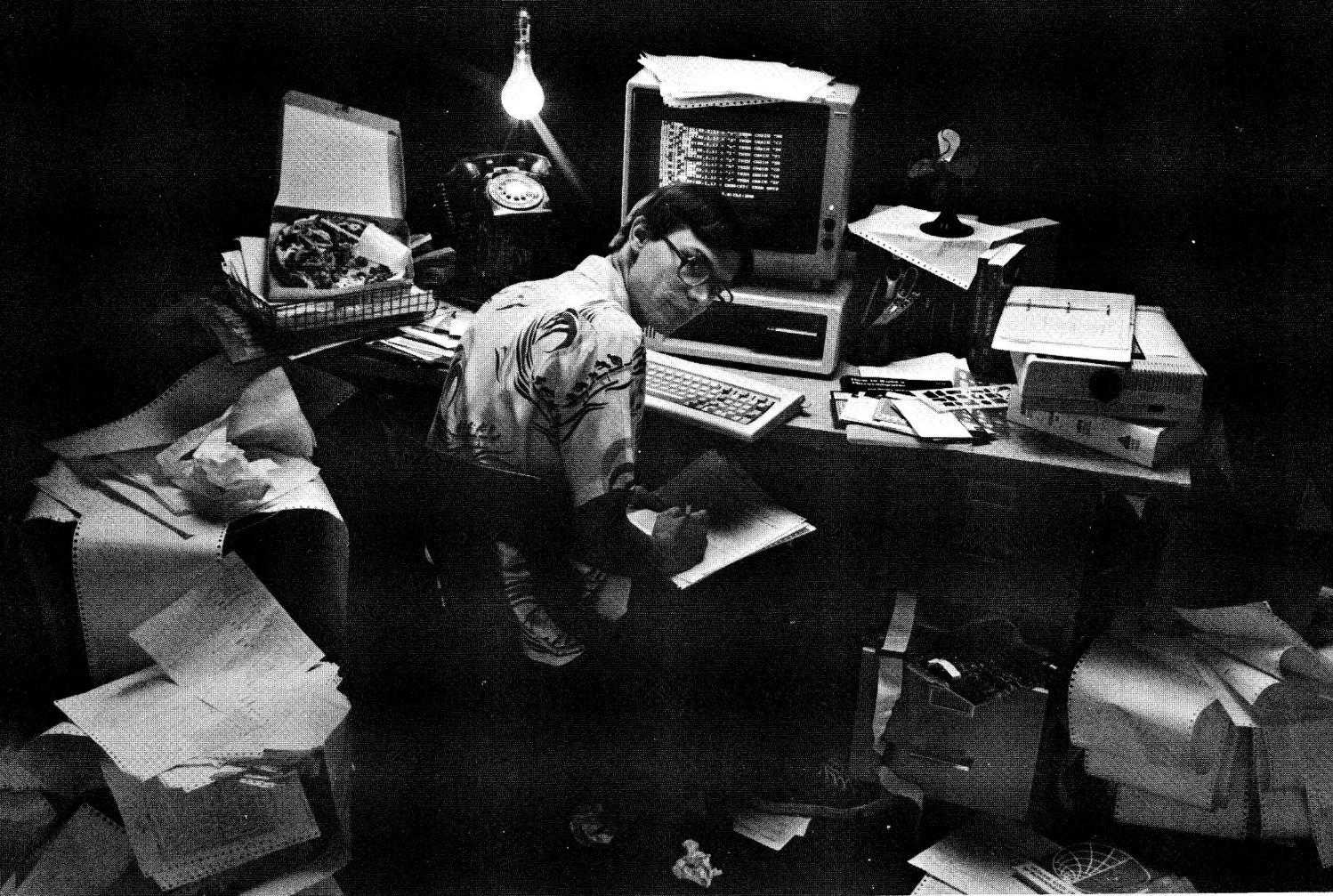
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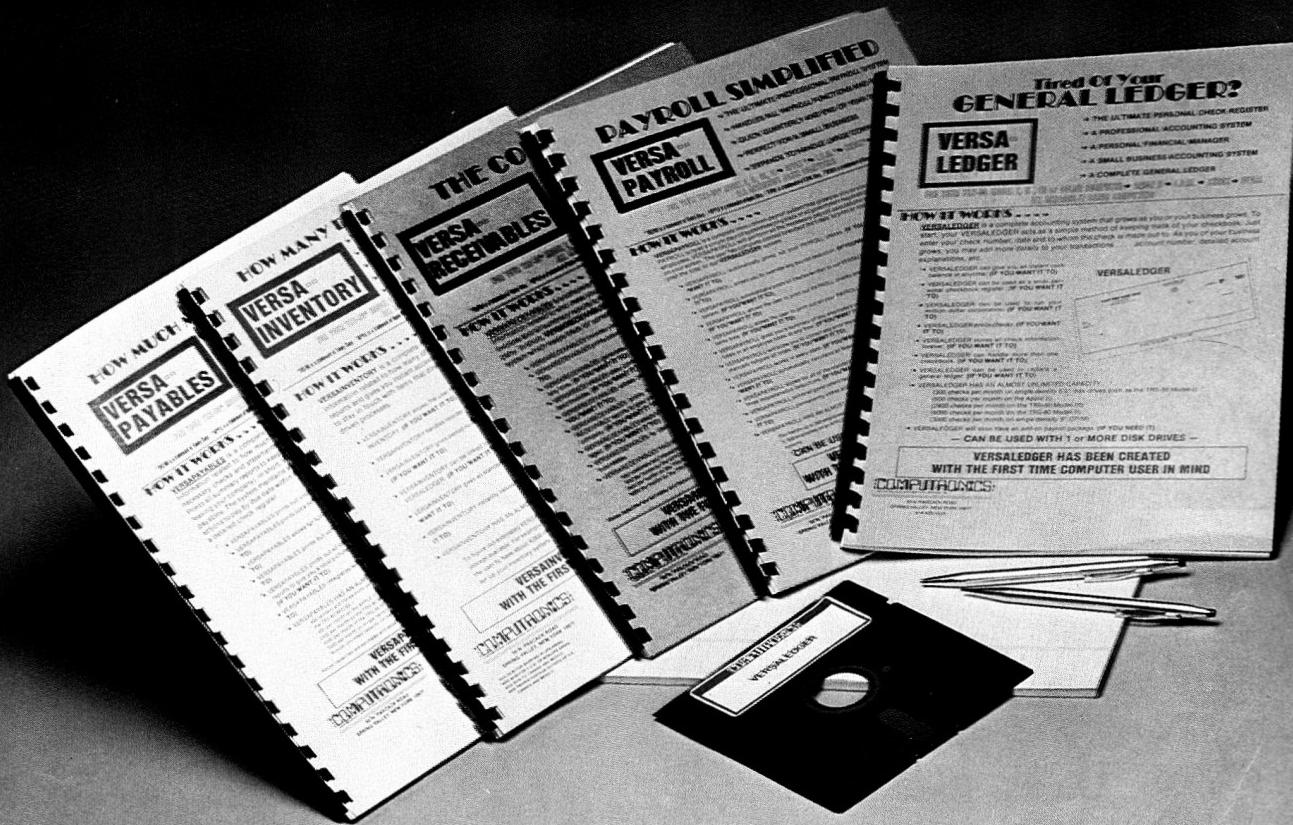


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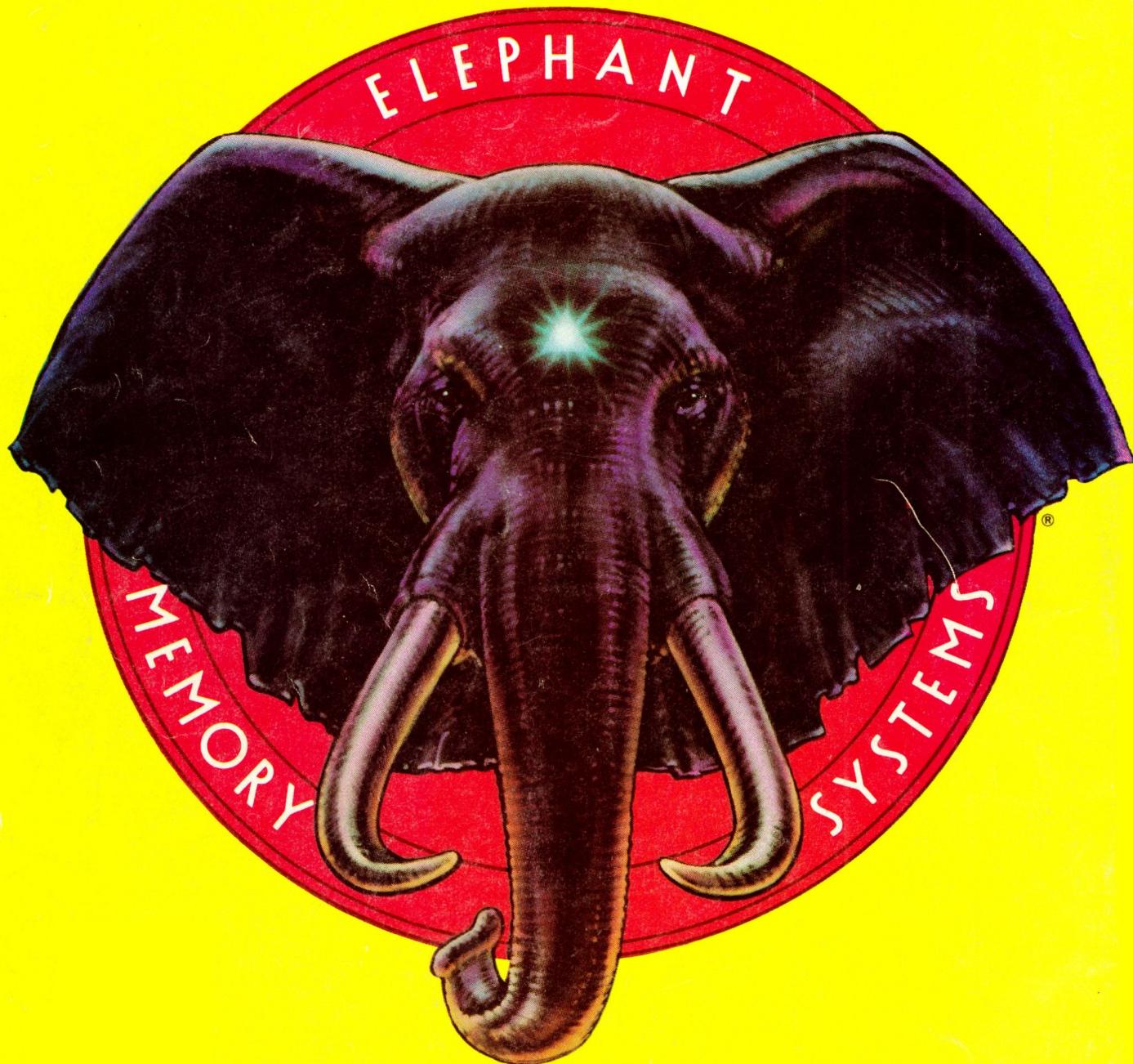
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